Instruction Manual

ZEISS SteREO Discovery Series

Stereo Microscope

ZEISS SteREO Discovery Series

Original Manual

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1 About this Instruction Manual

This Instruction Manual (further called "document") is considered to be part of the SteREO Discovery.V8, SteREO Discovery.V12 and SteREO Discovery.V20, herein after referred to as "microscope".

This document contains basic steps and safety information that must be observed during operation and maintenance. Therefore, the document must be read by the operator prior to commissioning and must always be available at the place of use of the microscope.

This document is an essential part of the microscope and, if the microscope is resold, the document must remain with the microscope or be handed over to the new owner.

1.1 Text Conventions and Link Types

Explanation	Example
Software controls and GUI elements.	Click **Start**.
Hardware controls and elements.	Press the **Standby** button.
Key on the keyboard.	Press **Enter** on the keyboard.
Press several keys on the keyboard simultaneously.	Press **Ctrl + Alt + Del**.
Follow a path in the software.	Select **Tools > Goto Control Panel > Airlock**.
Text to be entered by the user.	Enter *example.pdf* in this field.
Anything typed in literally during programming, for example macro codes and keywords.	Enter `Integer` in the console.
Link to further information within this document.	See: *Text Conventions and Link Types [▸ 6]*.
Link to a website.	https://www.zeiss.com

1.2 Explanation of Warning Messages and Additional Information

DANGER, WARNING, CAUTION, and NOTICE are standard signal words used to determine the levels of hazards and risks of personal injury and property damage.

Always observe the safety and warning messages in **all** chapters of this document. Failure to comply with these instructions and warnings may result in personal injury, property damage, and the loss of any claims for damages.

The following warning messages indicating dangerous situations and hazards are used in this document.

⚠ DANGER

Type and source of danger

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Type and source of danger

WARNING indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.

⚠ CAUTION

Type and source of danger

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

Type and source of danger

NOTICE indicates a potentially harmful situation which, if not avoided, may result in property damage.

Info

Provides additional information or explanations to help the operator better understand the contents of this document.

1.3 Explanation of Symbols

CE	CE marking (Conformité Européene)
UKCA	UKCA marking (UK conformity assessed)
	Manufacturer
	WEEE label: Do not discard as unsorted waste. Send to separate collection facilities for recovery and recycling

1.4 Further Applicable Documents

Brochures and Certificates For brochures, declarations of conformity, and other approval certificates ask your ZEISS Sales & Service Partner.

Local and National Health and Safety Regulations Observe local and national health and safety regulations for the location of installation and during the use of the microscope.

Consult with your ZEISS Sales & Service Partner if these regulations are in conflict with the installation requirements of the microscope.

Software For detailed information on how to use ZEN, refer to its manual (e.g. Online Help, Software Manual) or ask your ZEISS Sales & Service Partner.

Instruction Manuals

Also observe the following instruction manuals:

- ZEISS Sycop 3 - System control Panel for Zoom and Stereo Microscopes
- ZEISS EMS 3 - Electronic Module for Stereo and Zoom Microscopes
- Optional intermediate tubes (e.g Intermediate LED tubes S, Drawing tube S, Co-observation Equipment S)
- Oblique-view module S 0,3x with LED ring light
- Vertical Illuminator S
- Mechanical / Measuring stage S mot
- External light sources
  - Fiberoptic cold light sources (e.g. CL 6000 LED, CL 9000 LED CAN, CL 1500 HAL)
  - External LED illuminators (e.g. VisiLED series, High Power ring light HPRL, LED spot illuminators, EasyLED Spotlight Plus)
- Fiberoptic fluorescence excitation light sources (e.g. HXP 120 V, HXP 200, X-Cite XYLIS II, Viluma 9)
- Alternative stands (Stand M LED, Stand U, Stand B, Stand SDA, Floor Stand S)
- ZEISS SVB 1 - Signal distribution box
- ZEISS Axiocam cameras

1.5 Contact

If you have any questions or problems, contact your local ZEISS Sales & Service Partner or one of the following addresses:

Headquarters

Phone:	+49 1803 33 63 34
Fax:	+49 3641 64 3439
Email:	info.microscopy.de@zeiss.com

Microscopy Courses, Training, and Education

For information on microscopy courses, training, and education visit the ZEISS Academy Microscopy (https://www.zeiss.com/microscopy/en/service-support/training-education/academy-microscopy.html).

ZEISS Portal

The ZEISS Portal (https://portal.zeiss.com/) offers various services that simplify the daily work with your ZEISS systems (machines and software).

Service Germany

Phone:	+49 7364 20 3800
Fax:	+49 7364 20 3226
Email:	service.microscopy.de@zeiss.com

2 Safety

This chapter contains general requirements for safe working practices. Any person using the microscope or commissioned with installation or maintenance must read and observe these general safety instructions. Knowledge of basic safety instructions and requirements is a precondition for safe and fault-free operation. Operational safety of the supplied microscope is only ensured if it is operated according to its intended use.

If any work is associated with residual risks, this is mentioned in the relevant parts of this document in a specific note. When components must be handled with special caution, they are marked with a warning label. These warnings must always be observed.

Improper use of the microscope and its components can easily lead to impairment of their function or even damage them. Damage caused by incorrect operation, negligence, or unauthorized intervention, in particular by removing, modifying, or replacing parts of the microscope or its components, cannot be held liable by the device manufacturer. Third-party devices or components that are not expressly approved by ZEISS may not be used.

Any serious incident that has occurred in relation to the microscope and its components shall be reported to these institutions:

- the competent authority of the Member State in which the user is established
- Carl Zeiss Microscopy GmbH, Jena, Germany

2.1 Intended Purpose

The SteREO Discovery stereomicroscopes are instruments for the magnified, stereoscopic observation and 2D image documentation of small objects.

The microscopes are primarily used in biological laboratories, industrial manufacturing and quality assurance as well as forensics.

They are used for observing, testing, preparing, assembling, sorting and microsampling (dissection, stimulation, manipulation) of objects and specimens of various types and conditions.

SteREO Discovery is intended for use in research and routine applications.

It is not intended to directly or indirectly generate medical diagnostic results.

SteREO Discovery microscopes include:

- SteREO Discovery.V8
- SteREO Discovery.V12
- SteREO Discovery.V20

2.2 General Safety Information

This document must be read before commissioning in order to ensure safe and uninterrupted operation. Pay particular attention to all listed safety notes. Make sure, that

- the operating personnel has read and understood this manual, associated documents and particularly all safety regulations and instructions, and applies them.
- the local and national safety and accident prevention regulations must be observed, as well as the applicable laws and regulations in your country.
- this document is always available at the place of use of the microscope.
- the microscope is always in perfect condition.
- in case of defect or damage, the affected parts and the microscope are taken out of operation immediately and are secured against unintentional use.
- maintenance and repair work, retrofitting, removal or replacement of components, as well as any other intervention in the microscope not described in this document, may only be carried out by the manufacturer ZEISS or persons expressly authorized by ZEISS to do so.

2.2.1 Requirements for Operators

The microscope, components, and accessories may only be operated and maintained by authorized and trained personnel. The microscope may only be used in accordance with this document. If the microscope is not used as described, the safety of the user may be impaired and/or the microscope may be damaged.

Any unauthorized intervention or use other than within the scope of the intended use shall void all rights to warranty claims. The regional regulations on health protection and accident prevention must be observed at all times and during all work on and with the microscope.

2.2.2 Safe Operating Condition

If circumstances occur which impair safety and cause changes in operating behavior, the microscope and its components must be shut down immediately and a ZEISS service representative should be informed.

The microscope may only be operated if the operating conditions are adhered to.

- Do not operate the microscope and its components until you have completely read and understood the entire documentation.
- Make sure that all protective cover panels are installed and all warning labels are available and legible.
- Ensure conditions and take measures to prevent the build up of electrostatic charge on the workplace.

2.2.3 Order and Use of Spare Parts

Using spare parts that are not provided by ZEISS can be hazardous or can lead to property damage.

- Unless authorized by ZEISS, all spare parts should be installed by a ZEISS service representative.
- Contact your ZEISS service representative for information on spare parts order.
- Only genuine parts supplied by ZEISS are to be used in servicing the microscope and its components.

2.2.4 EMC Information

The microscope is intended to be used in a basic electromagnetic environment.

The microscope complies with the emission and immunity requirements as a CISPR 11 / EN 55011 / class A group 1 system according to IEC 61326-1. Emissions, which exceed the levels required by CISPR 11 / EN 55011, can occur when the microscope is connected to other devices.

External interferences such as electrostatic discharge can interrupt the function of the illumination units X-Cite XYLIS II and Viluma 9. This is not a defect. Correct function can be restored by restarting the illumination unit. There is no damage to the illumination unit. In this case it may help to remove the source of interference from the vicinity of the illumination unit.

External interferences such as conducted disturbances induced by RF fields, surges, or electrical fast transients (bursts) can interrupt the function of the X-Cite XYLIS II illumination unit. This is not a defect. Correct function can be restored by restarting the illumination unit. There is no damage to the illumination unit. In the case of conducted disturbances induced by RF fields, it may be helpful to remove the interference source from the immediate vicinity of the light source. In the case of conducted disturbances induced by surges or electrical fast transients (bursts), transient protection is a possible protective measure.

The following EMC user notice is for Korea only:

기종별	사용자안내문
A급기기(업무용방송통신기자재)	이기기는업무용(A급) 전자파적합기기로서 판매자또는사용자는이점을주의하시기바라며, 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

2.2.5 Optical Risk Grouping

According to IEC 62471 sources of optical radiation are classified into risk groups subject to their potential photobiological hazard. Sources are classified into the following four groups according to hazard, based on the emission limit as well as permissible exposure time before hazard exceeded.

Risk group	Description
Exempt	No photobiological hazard.
1	No hazard due to normal behaviourial limitations on exposure.
2	No hazard due to the aversion response to very bright light sources or thermal discomfort.
3	Hazardous even for momentary exposure.

The following table lists the risk grouping of the available light sources/illumination units according to the mentioned standard:

Fiberoptic light sources

Light source/Illumination unit	Risk group
CL 1500 HAL	2 (moderate risk)
CL 6000 LED	2 (moderate risk)
CL 9000 LED CAN	2 (moderate risk)
HXP 200	2 (moderate risk)
HXP 120 V	2 (moderate risk)
X-Cite XYLIS II	3 (high risk)
Viluma 9	3 (high risk)

Direct LED illuminators

Light source/Illumination unit	Risk group
VisiLED ring light series (S80-55BF, S80-25BF, S40-10DF, slim ringlight)	1 (low risk)
VisiLED transmitted light BF	1 (low risk)
EasyLED Spotlight Plus	1 (low risk)
High Power ringlight HPRL	Exempt
High power LED double spot	Exempt

2.3 Prevention of Hazards

This section summarizes potential hazards and recommended safety precautions. Failure to follow the safety instructions and instructions may result in personal injury and property damage.

2.3.1 Mechanical Hazards

Crushing Hazards due to Motorized Components

The microscope contains motorized components. Fingers could be trapped. Do not reach into the working area of motorized components when they are in operation.

Automatic travel of the motorized focus drive can be interrupted by pressing the **STOP** button on the focusing drive or by moving the knurled wheel on the HIP up and down.

The lower limit switch of the motorized focusing drive must always be correctly adjusted to prevent the objective from colliding with the stage or the sample.

2.3.2 Electrical Hazards

Voltage Hazards

Risk of electric shock in case of contact with live parts.

- Detachable mains supply cords must not be replaced with inadequately rated cords.
- Disconnect all power cords before cleaning.
- Only connect electrical systems that are authorized by ZEISS to the supplied power supply cord.
- Set up and operate the microscope so that the connectors are easily accessible.
- Position the microscope in a way so that you can easily unplug the power cord at any time.
- The microscope must be plugged into a properly installed power socket with protective earth contact using the supplied mains cords. The protective earth connection must not be impaired by the use of extension cables.
- Always use the power cords supplied by ZEISS. When an unsuitable power cord is used, ZEISS can no longer guarantee the electrical safety and functionality of the microscope.
- Shut down the microscope when not using the microscope.
- Safe disconnection from the power supply is only ensured by pulling out the power cord. The switch on the microscope only switches to standby mode.

2.3.3 Thermal Hazards

Burning Hazards

Hot surfaces, radiation and/or aggressive chemicals can cause burns.

- Use suitable protective equipment / protective clothing if mandatory.
- Always observe the cooling time of the hot surfaces.

Adding more than one power supply might lead to heating up of the power supplies.

- Supply the CAN network of the microscope with one power supply only (one plug-in power supply or the integrated power supply of the EMS3 electronic module).

Heat Accumulation

Covering the ventilation openings can lead to heat accumulation that may damage the product and, in extreme cases, can cause a fire.

- Keep ventilation openings unobstructed at all times.
- Do not cover devices or openings emitting heat.
- Do not obstruct ventilation.
- Comply with minimum distance from walls. The distance of the system to the wall should be at least 15 cm, in order to ensure sufficient air circulation and accessibility of the cabling.

Using Fiberoptic Light Sources

Covering the light guide outlet can lead to heat accumulation that can cause burns and fire.

- Never cover the light guide outlet when the light source is switched on.
- Never close the light guide outlet with your hands or other parts of your body.

- Keep all light guides in a safety distance of 10 cm from heat-sensitive or flammable light-absorbing objects or materials.
- Reduce the brightness and duration of the lighting to the necessary minimum.

2.3.4 Hazards Generated by Radiation

Optical Radiation Hazards

Gas discharge lights, LED lights and other sources of white light emit strong optical radiation (e.g. UV, VIS, IR). Optical radiation may cause damage to the skin and eyes. The extent of the damage depends on the parameters such as wavelength, exposure time, mode of operation (continuous or pulsed), etc.

- Avoid exposure of eyes and skin to radiation.
- Do not introduce reflective objects into the beam path.
- Never remove covers or cover panels during operation.
- Do not disable any interlock system elements.
- Use suitable protective equipment / protective clothing if required.
- When working with fiber optic light sources, never look directly into the light guide output to avoid the risk of being dazzled or going blind.

2.3.5 Ergonomic Hazards

Prevention of Musculoskeletal Disorders

Musculoskeletal disorders (MSDs) affect the muscles, nerves, blood vessels, ligaments and tendons. Workers in many different industries and occupations can be exposed to risk factors at work, such as lifting heavy items, bending, reaching overhead, pushing and pulling heavy loads, working in awkward body postures and performing the same or similar tasks repetitively. Employers are responsible for providing a safe and healthful workplace for their workers.

2.3.6 Hazards Generated with the Operating Environment

Dirt, Dust, and Moisture

Dirt, dust, and moisture can impair the microscope's functionality.

- Shut down the microscope whenever it is not used and cover it with a dust protection cover.
- Always cover unused openings/ports with the corresponding system component or with blind caps.
- Perform regular maintenance and cleaning according to the instructions in this manual.
- Make sure that no cleaning liquid or moisture gets inside the microscope.
- Make sure that the electrical parts never come into contact with moisture.
- Never expose the microscope to inadmissible climate conditions (high humidity and temperature).

Explosive Hazard

Fire hazard due to explosive or flammable environment.

Do not operate the microscope and its components in a potentially explosive atmosphere, in the presence of volatile anesthetics or flammable solvents such as alcohol, petrol, or similar substances.

2.4 Labels and Lights

This chapter shows labels and, where applicable, indicator lights.

All parts that may pose specific hazards are marked with warning labels.

Always observe **all** warning labels!

- Check all warning labels for availability and legibility.
- Immediately replace damaged or illegible warning labels.

In case a label is missing, contact your ZEISS service representative for free of charge replacement.

2.4.1 Labels on the Microscope

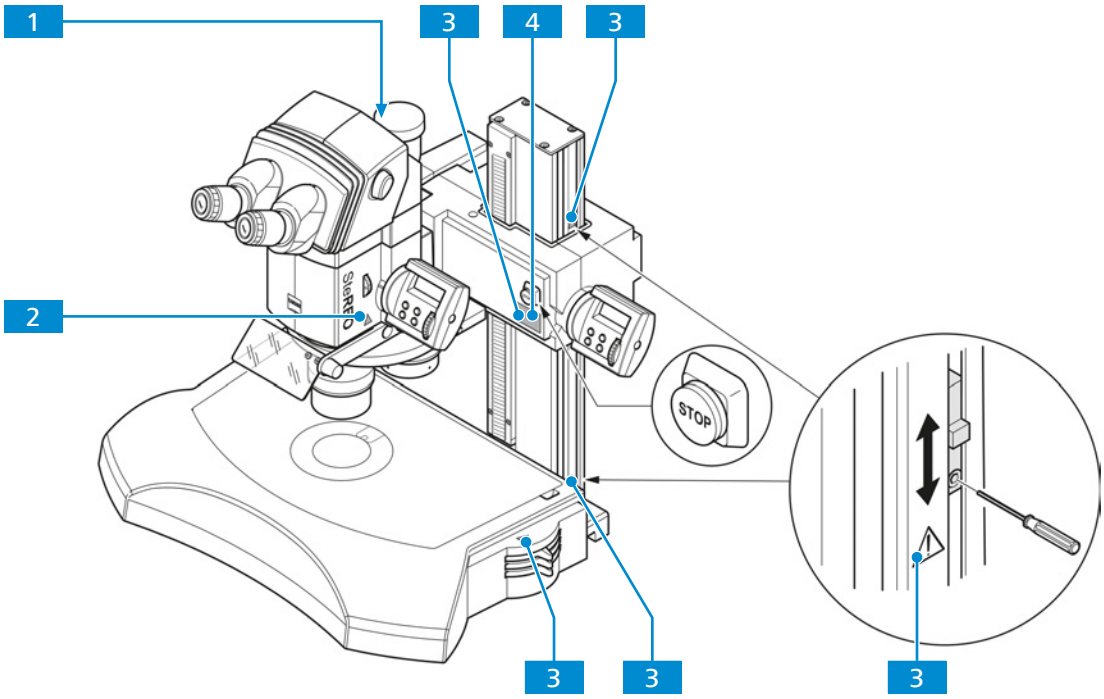


Fig. 1: Labels on the microscope

Pos.	Label or light	Explanation
1		Type label
2		LED radiation! Avoid exposure to radiation.
3		Possible danger! Observe notes in the instruction manual and the supplied documents.
4		Crushing hazard! Fingers may be pinched!

3 Product and Functional Description

The SteREO Discovery stereo microscopes are instruments for the magnified, stereoscopic observation of small objects, typically in the size range from 10 centimeters to less than 50 micrometers.

The natural, spatial shape of the objects is retained - no sample preparation is required. When viewed through the eyepieces, the objects appear three-dimensional with excellent depth perception. This enables an intuitive understanding of the spatial object structures and precise sample handling.

SteREO Discovery is characterized by an impressive stereo impression, excellent optical quality, large free working distances and a generous sample space. The optical pancratic zoom system ensures high-contrast, sharp images across the entire field of view and the entire zoom range. Once the basic setting of the stereomicroscope has been made, the image remains exactly in focus when zooming.

In addition to visual stereoscopic observation, SteREO Discovery is designed for 2D documentation and imaging of microscopic objects and work results. The optional vertical view mode enables documentation without parallax errors.

The comprehensive motorization of SteREO Discovery (zoom, focus drive, mechanical stage and more) in combination with the ZEISS Imaging Software ZEN enables the integration of the microscopes into automated workflows, such as the Technical Cleanliness Analysis Workflow. Further examples are the automated generation of extended depth of field images or large-area images composed of many individual image tiles.

Thanks to its telescope or CMO design, in which two parallel beam paths share a "Common Main Objective", the SteREO Discovery is highly modular system so that the microscope configuration can be optimally adapted to a wide range of application requirements.

Typical tasks with SteREO Discovery are the observation, screening, sorting, preparation, and microsampling (dissection, stimulation, manipulation) of biological and geological objects, and materials of all kinds - as well as the inspection, testing, assembly, and repair of industrial workpieces, components, modules, and devices.

Typical applications

- Life science research facilities and routine bio laboratories
- Materials and geoscientific research facilities
- Industrial research, development, production and quality assurance departments
- Forensic investigation centers
- Museums

Typical branches of science and industry:

- Biology: botany, developmental biology, embryology, entomology, marine biology, microbiology, mycology, neuroscience, parasitology, zoology
- Plants and food: agronomy, forestry, fruit growing
- Medicines: pharmacology
- Materials: paleontology, gemmology, geology, materials testing
- Industries: Automotive and aviation industry, electrical industry, precision mechanics and optics, watch industry, medical technology, mineral oil industry, glass and plastics industry, pharmaceutical industry, food industry, paper and printing industry, telecommunications, semiconductor industry
- Forensics
- Restoration

3.1 Main Components of the SteREO Discovery.V8

SteREO Discovery is a highly modular system that can be flexibly adapted. A typical configuration of SteREO Discovery.V8 with manual focusing drive is shown.

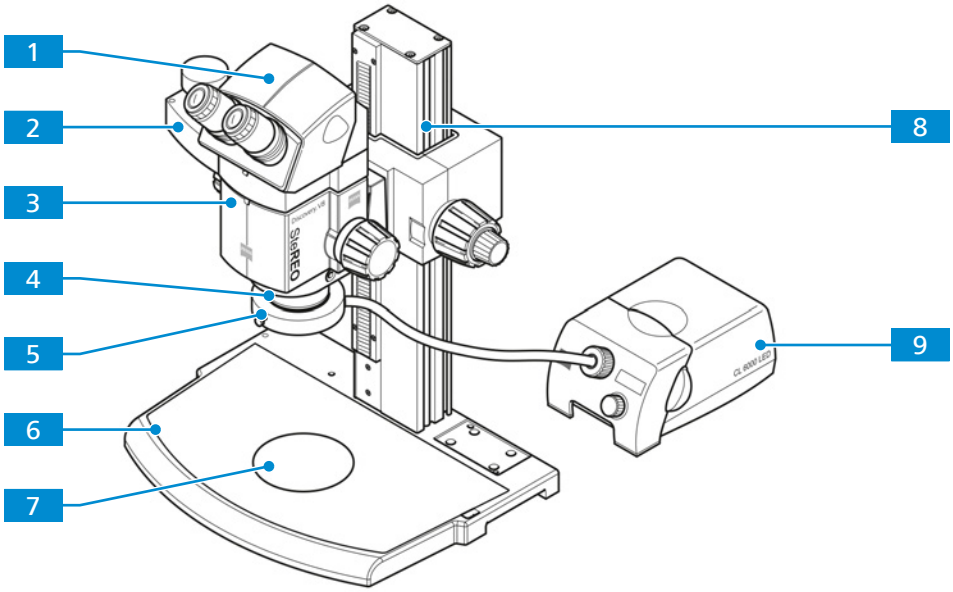


Fig. 2: Main components - SteREO Discovery.V8 (typical configuration)

1	Binocular tube	2	Intermediate phototube
3	Microscope body	4	Objective
5	Slit-ring illuminator	6	Stand base 450
7	B/W object plate, d=120 mm	8	Coarse/fine drive with column 490 mm
9	Cold-light source, e.g. CL 6000 LED		

3.1.1 Controls and Functional Elements of SteREO Discovery.V8 Stand

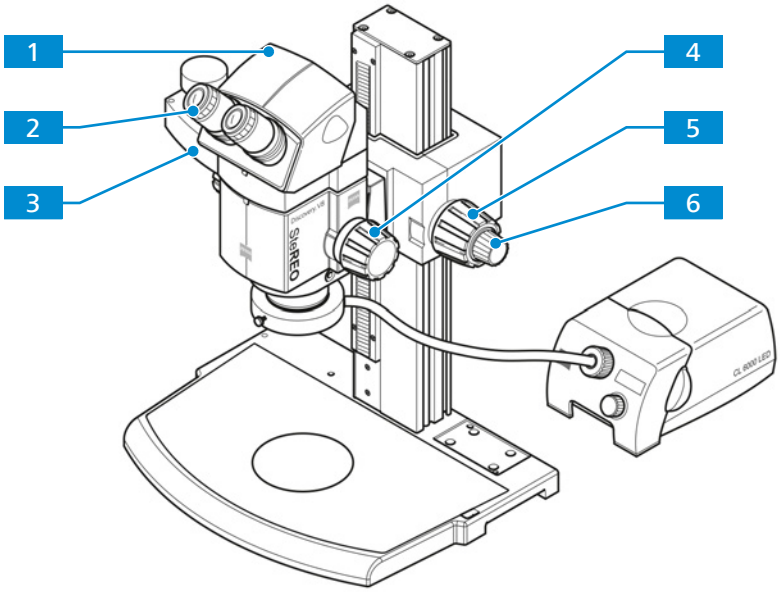


Fig. 3: Controls and Functional Elements of the SteREO Discovery.V8

1	Binocular tube with adjustable eyepiece distance	2	Eyepieces with diopter adjustment
3	Intermediate phototube, switchable to eyepiece and camera view	4	Zoom knob with switchable clickstops (on/off)
5	Coarse focusing knob and focus brake adjustment	6	Fine focusing knob

3.2 Main Components of the SteREO Discovery.V12/V20

SteREO Discovery is a highly modular system that can be flexibly adapted. A typical configuration of SteREO Discovery.V12/V20 with motorized focusing drive is shown.

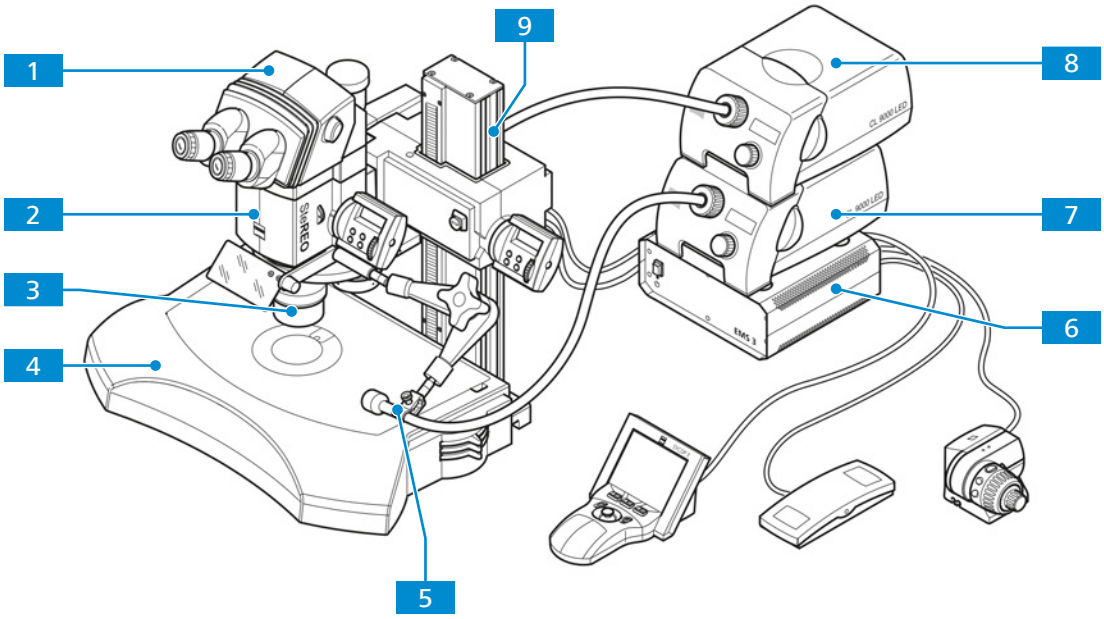


Fig. 4: Main components - SteREO Discovery.V12 and SteREO Discovery.V20 (typical configuration)

1	Binocular Ergo Phototube	2	Microscope body
3	Objective nosepiece with up to 3 objectives	4	Stand base 450 with transmitted light equipment S
5	Reflected light spot illuminator with holding arm	6	Electronics module EMS 3
7	Cold light source CL 9000 LED CAN for reflected light illuminators	8	Cold light source CL 9000 LED CAN for transmitted light equipment
9	Motorized focusing drive with profile column 490 mm		

3.2.1 Controls and Functional Elements of SteREO Discovery.V12/V20 Stand

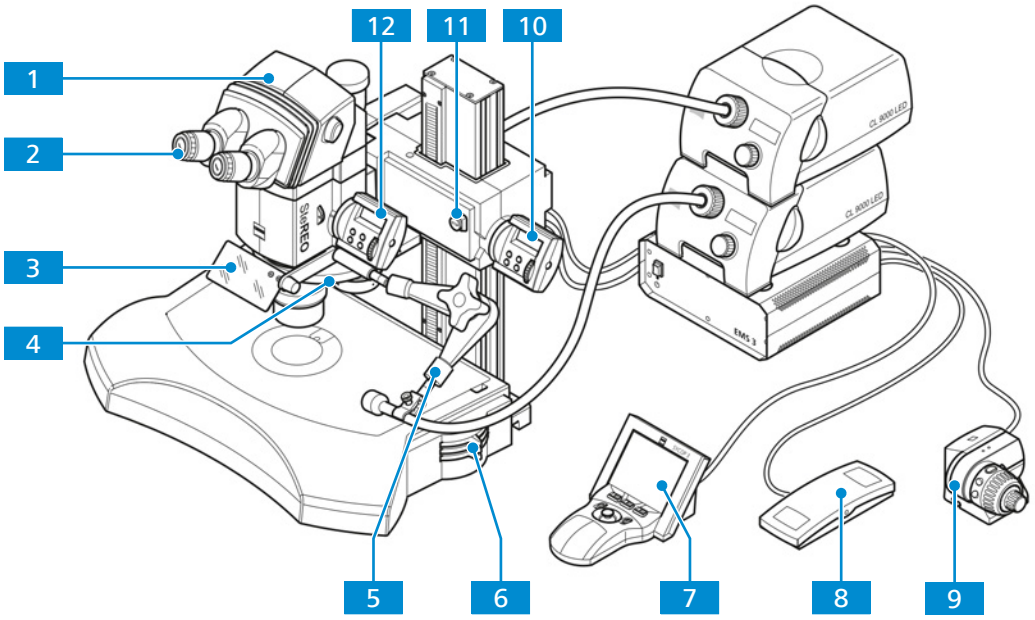


Fig. 5: Controls and Functional Elements of the SteREO Discovery.V12 and SteREO Discovery.V20

1	Binocular ergo photo tube with adjustable eyepiece distance, viewing height and angle of insight	**2**	Eyepieces with diopter adjustment
3	Anti-glare shield	**4**	Objective nosepiece, 6x encoded (3 stereo and 3 vertical view positions)
5	Reflected light spot illuminator with holding arm	**6**	Operation controls for transmitted light contrasts
7	System control panel Sycop 3	**8**	Foot pedal for focus or zoom control
9	*MaRC [▸ 58]* unit with coarse/fine focusing knobs and buttons for fast focusing and zooming	**10**	*Focus control unit HIP [▸ 23]*
11	**STOP** button	**12**	*Zoom control unit HIP [▸ 23]*

3.3 Eyepieces

Purpose The eyepieces serve to observe the microscopic image.

Position The eyepieces are inserted into the eyepiece sockets of the binocular tube.

Function All eyepieces are equipped with a focusing ring to compensate for defective vision. The imprinted diopter scale helps to find the correct setting.
The 10x and 16x magnification eyepieces are suitable for spectacle wearers. They include a rubber ring to protect glasses from scratches. The protective rings can be replaced by fold-down eyecups if required.
When using the microscope for fluorescence applications, special eyecups with light protection can be used. However, they cannot be folded over and are not suitable for spectacle wearers.

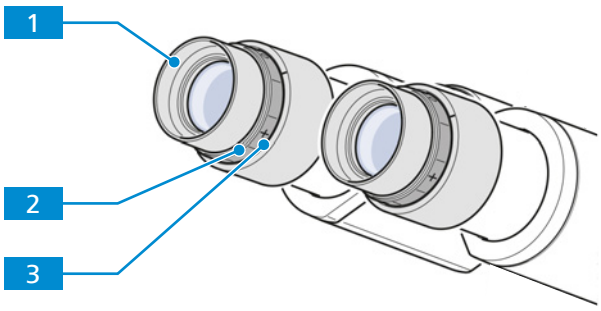


Fig. 6: Eyepiece

1	Eyecup (e.g. Foldover rubber eyecup)	2	Focusing ring
3	Diopter scale		

3.3.1 Eyepieces with Eyepiece Reticles

Purpose The eyepieces with reticles are used to observe the microscopic image in special microscopy procedures, such as measuring, counting and comparing in the eyepiece view.

Position The eyepieces with reticles are inserted into the tube.

The eyepiece reticles must be inserted under dust-free conditions. This should be carried out only by ZEISS Service.

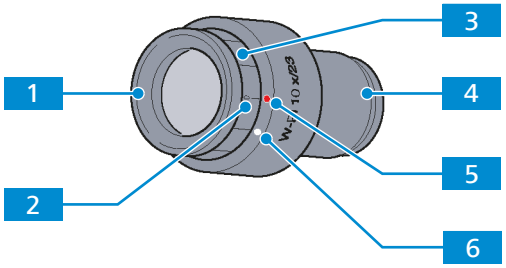


Fig. 7: Eyepiece with installed eyepiece reticle

1	Eyecup, changeable	2	Diopter scale with zero point to facilitate finding the correct setting
3	Focusing ring for compensation of defective vision	4	Mounting stop with inserted eyepiece reticle
5	Red dot, corresponds to the zero diopter setting when a reticle is inserted	6	White dot, corresponds to the zero diopter setting when no reticle is inserted

3.4 Objective Nosepiece S/doc

Function The Objective nosepiece S/doc, 3x, 6x cod. is a central component of the SteREO Discovery stand system 450. It combines the support for the microscope body (mount S) with an objective nosepiece for three SteREO Discovery objectives.

Each objective can be positioned centrally under the microscope for stereoscopic viewing (stereo or "3D" position) or moved laterally under the right-hand microscope channel for vertical viewing (macroscope, documentation or "2D" position).

All six objective positions are provided with clickstops and coded so that the selected objective and its viewing position can be displayed on the Sycop 3 display and in the ZEN software.

In addition, special fiber optic illuminators, the Slit ring illuminators d=66mm without light guides, can be attached to each objective and to the nosepiece - for bright, shadow-free illumination and for easy objective changes without disturbing cables or light guides. Light guide rods of different lengths adapt the ring illuminators to the different objective heights.

Position The objective nosepiece may be attached to the Focus motor 3 with central profile column 490 mm as well as to the manual Coarse/fine drive with profile column 490 mm .

The objective nosepiece is suited for 2 groups of parfocalized objectives:

- Objectives with parfocal distance 137 mm: Achromat S 0.63x, Plan S 1.0x, PlanApo S 0.63x, PlanApo S 1.0x, PlanApo S 1.5x
- Objectives with parfocal distance 93 mm: Achromat S 1.0x, Achromat S 1.25x, Achromat S 1.5x, Plan Apo S 3.5x mono

3.5 Reflected Light Illumination System for Objective Nosepiece S/doc

Purpose To ensure bright, shadow-free illumination and easy objective changing without interfering cables or light guides, a special illumination system was developed for the objective nosepiece S/doc. It consists of two supply light guides and up to three slit ring illuminators d = 66 mm without light guides.

Position The supply light guides are attached to two light guide mounts on top of the nosepiece - one for the stereo and one for the vertical viewing position.

The slit ring illuminators without light guides are attached from below a) to the objectives and b) to corresponding light guide mounts in the rotating part of the nosepiece. Light guide rods of different lengths compensate for the height differences between the ring lights and the various objectives.

Function The supplied light is directed via the light guide rods to the slit ring illuminator on the respective objective being used.

The light guide mounts serve as a transmission interface between the incoming light guides and the subsequent slit ring illuminators.

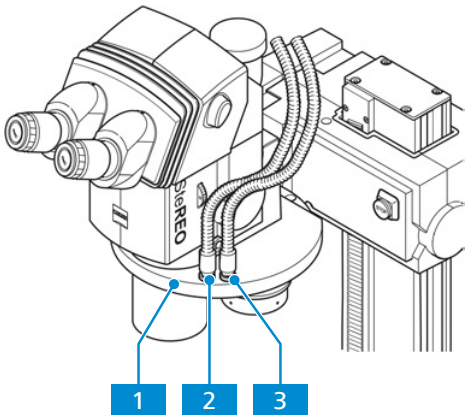


Fig. 8: Light guide mount

1 Objective nosepiece S/doc

2 Light guide mount in stereo position

3 Light guide mount in macroscope position

Info

Instead of the two-arm light guide shown, a single-arm supply light guide may also be used. The supply light guide must then be relocated when changing from the stereo position to the vertical view position.

3.6 Human Interface Panel Control Unit (HIP)

Purpose The HIPs are basic control units for controlling and configuring the microscope.

Info

When Sycop 3 is available, the HIPs are not mandatory. They can still be used for zooming/focusing or as a display, but all system settings must be made via Sycop 3.

Function One HIP, mounted on the microscope body, controls zooming, displays optical parameters and allows the setting of zoom and magnification parameters. Another HIP, which is mounted on the motorized focus drive, controls focusing and allows the setting of focus parameters.

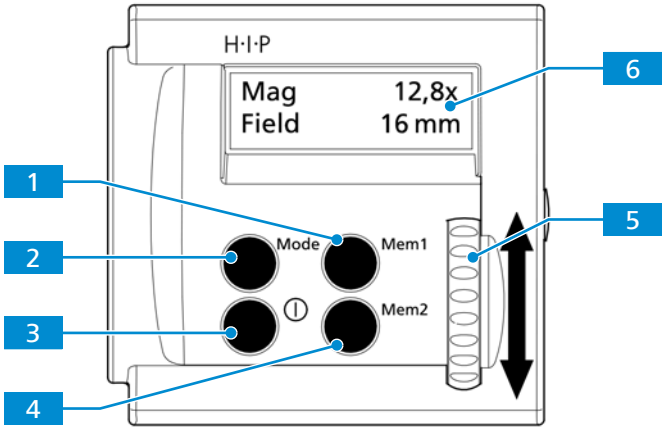


Fig. 9: Control and functional elements of the HIP

1	**Mem1** button	2	**Mode** button
3	⏻ button	4	**Mem2** button
5	Knurled wheel (joystick functionality)	6	Two-line display

Info

Further control units are:

- the manual rotary control *MaRC [▸ 58]*, optimized for particularly sensitive focusing and precise zooming
- the system control panel Sycop 3, which offers comprehensive system control including motorized zoom, focus, stages, illuminators and more (see separate instruction manual).

3.6.1 Functionality and Operation of the HIP Units

The HIP control units have two modes: the Basic Mode for microscope operation and the Setting Mode for configuring microscope parameters.

Element	Basic mode		Setting mode
	Zoom Control Unit	**Focus Control Unit**	
Two-line display	Top line displays the total magnification viewed in the eyepieces (**Mag**)*	Top line displays **Focus**	Top line displays the system parameter selected to be configured. Bottom line displays the available parameter values.
	Bottom line displays current optical parameters: ▪ **Field**: object field diameter [mm] ▪ **Resol**: Resolution [µm] ▪ **Depth**: Depth of field [mm or µm]	Bottom line displays the current focus position Z [mm]	
Mode button	Short press (several times): Show different optical parameters	Short press: Reset the focus value to zero	Short press (several times): Call up the desired system parameter to be configured.
	Long press (two seconds): ▪ Change to Setting mode ▪ Acknowledgment signal sounds	Long press (two seconds): ▪ Change to Setting mode ▪ Acknowledgment signal sounds	Long press (two seconds): ▪ Permanently store the newly selected parameter values ▪ Switch back to Basic Mode ▪ Acknowledgment signal sounds
Knurled wheel	Move up/down to zoom: ▪ Deflect slightly for fine zooming ▪ Deflect more for faster zooming	Move up/down to focus: ▪ Deflect slightly for fine focusing ▪ Deflect more for faster focusing	Move up/down (several times): ▪ Select the desired parameter value
		Short press: Toggle between focusing modes (slow, medium, fast)	-
Mem1/Mem2 buttons	Short press: Recall the stored zoom value	Short press: Recall the stored focus position	-
	Long press (two seconds): ▪ Store the current zoom value ▪ Acknowledgment signal sounds.	Long press (two seconds): ▪ Store the current focus position ▪ Acknowledgment signal sounds.	-
Button ⏻	Switch on/off (standby) for HIP and microscope body	Switch on/off (standby) for HIP and motorized focus drive	-

*Total magnification = zoom magnification x objective magnification x eyepiece magnification x optional tube factor

3.6.2 Parameters for the Zoom Control (Setting Mode)

Parameters		Values	Remarks
Backlight	Adjust display brightness	12-stage progress bar	Move the knurled wheel up/ down for increasing and reducing background brightness
Beep Level	Switch acknowledgment signal on/off	ON & OFF	Activation recommended
Set Lens	Select currently installed objectives If using the objective nosepiece, swivel the objectives one after the other to the working position and select the lens magnification separately before saving the newly selected parameters.	Achro 1.5x Achro 1.25x Achro 1.0x Achro 0.63x Achro 0.5x Achro 0.3x PlanApo 3.5x PlanApo 2.3x PlanApo 1.5x PlanApo 1.0x PlanApo 0.63x Plan 1.0x	Required for correct display of the total magnification (**Mag**)
Set Eyepiece	Select currently installed eyepiece	25x/10 foc 16x/16 Br foc 10x/23 Br foc 10x/20 Br foc	Required for correct display of the total magnification (**Mag**)
Confirmation	Switch the start query on/off	ON & OFF	The start query is useful, when the objective or eyepiece type is to be changed frequently.
Zoom speed	Set the zoom profile	1, 2, 3	"Slow, medium or fast" increase of the zoom speed (when the knurled wheel is deflected)
Reset Param?	Reset to factory default	NO & YES	

3.6.3 Parameters for the Focus Control (Setting Mode)

Parameters		Values	Remarks
Backlight	Adjust display brightness	12-stage progress bar	Move the knurled wheel up/ down for increasing and reducing background brightness
Beep Level	Switch acknowledgment signal on/off	ON & OFF	Activation recommended
Focus Speed	Set the focus profile	1, 2, 3 slow & fast	Select "slow, medium or fast" increase of the focus speed (when the knurled wheel is deflected). The fine focus mode is not affected.
Reset Param?	Reset to factory default	NO & YES	

4 Installation

Perform only the installation work described in this document. All other installation work not described may only be carried out by an authorized ZEISS service representative.

4.1 Unpacking and Setting up the Microscope

Procedure

1. Open the packaging.
2. Take the microscope, all assemblies, and accessories out of the packaging.
3. Check them for completeness as per delivery note.
4. Check all parts for damaging.
5. Place the microscope on a vibration-free, level, and non-inflammable surface.

It is recommended to keep the original packing and store it away for later use, e.g. for stowing the microscope during periods of non-use or for returning the microscope to the manufacturer for repair.

4.2 Installing the Stand Components

Parts and Tools

- Hex key, 5.0 mm
- Hex key, 8.0 mm

NOTICE

Damage of motorized focusing drive due to wrong handling

The motorized focusing drive can be damaged when handled incautiously.

- Only put the motorized focusing drive down on the back of the column using sufficiently high supporting blocks.
- Do not lay the focusing drive on the rack side. Do not use the housing of the movable drive as a support.
- Only lift and carry the motorized focusing drive by holding it on the column. Do not lift the motorized focusing drive by the housing of the movable drive.
- Avoid heavy shocks to the motorized focusing drive.

Info

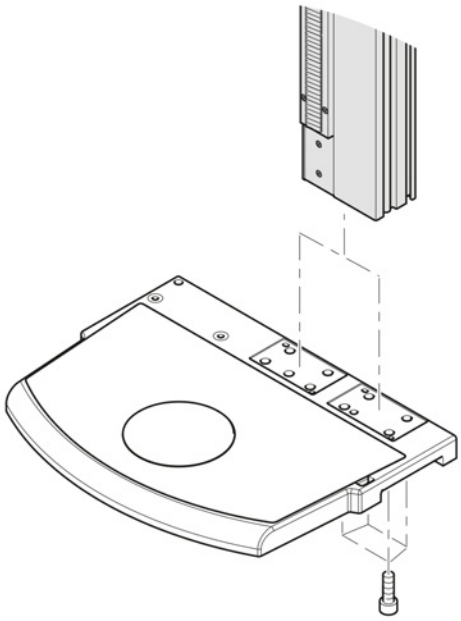
To provide 10 cm more sample height, the carrier can be screwed on rotated by 180°. In this case, the objective slider S/doc and the coaxial epi-illuminator S cannot be installed.

Prerequisite

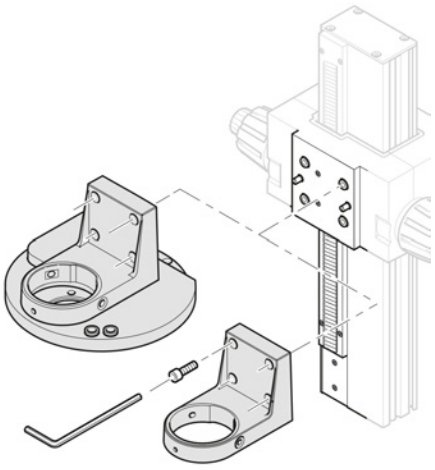
- ✓ Sufficient table space is provided to set up the microscope and peripheral accessories (recommended 800 x 800 mm).
- ✓ On the objective nosepiece, *stoppers are inserted [▸ 36]*.

Procedure

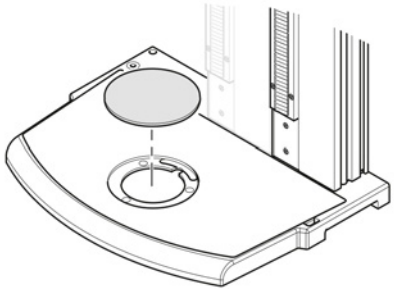
1. Attach the column to the stand base and let the two centering pins slide into place.



   a Use the left mounting surface for the manual coarse/fine drives with 350 mm and 490 mm profile columns, and for the motorized focus drive with central profile column.
   b Use the right mounting surface for mounting the coobservation equipment S.
2. Fix the column with four screws through the stand base.
3. Set up the stand base with the column.
4. If required, *assemble the transmitted-light equipment S [▸ 68]*.
5. If required, *assemble the stage [▸ 29]*.
6. Put the carrier or the objective nosepiece onto the focusing drive and let the two centering pins slide into place.



7. Hold the component in place until the first screw is fixed.
8. Fix the component with four screws.
9. Insert the 120 mm B/W plastic plate.



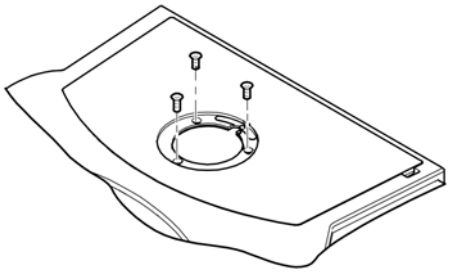
10. *Adjust the travel of the motorized focusing drive [▸ 32]*.

4.3 Installing the Stage with 84 mm Interface

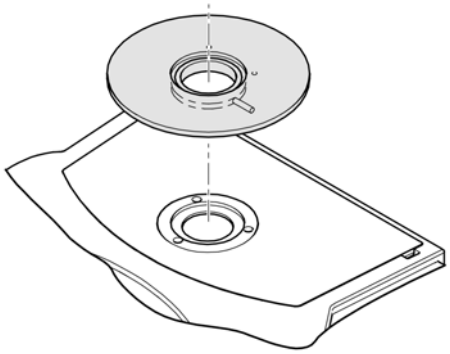
Parts and Tools
- Hex key, 3.0 mm
- 84/120 mm stage adapter

Procedure

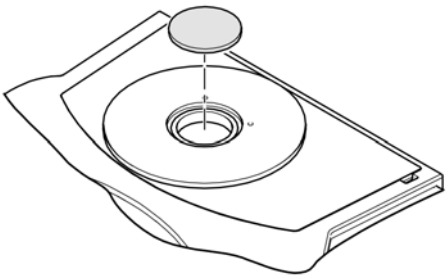
1. Unscrew three short Allen screws (SW 3) from the insert plate.



2. Fix the stage adapter with three longer Allen screws through the insert plate.
3. Put the stage onto the stage adapter and align it.



4. Turn the eccentric clamping lever to clamp the stage in the stage adapter.
5. Put the round 84 mm plate into the stage interface.



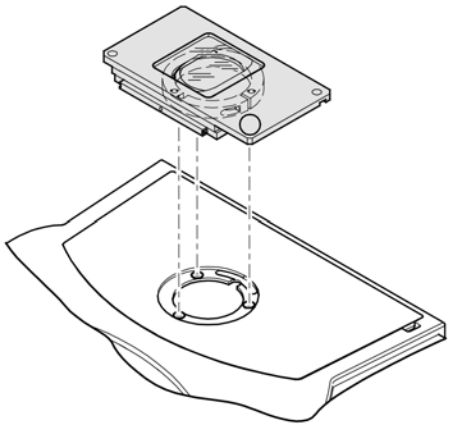
4.4 Installing the Stage with 120 mm Interface

Parts and Tools
- Hex key, 3.0 mm

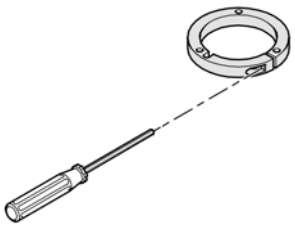
Prerequisite
- ✓ The stage clamping ring is assembled to the stage.

Procedure

1. Put the stage with installed stage-clamping ring onto the insert plate.



2. Align the stage.
3. Clamp the stage-clamping ring in the insert plate by turning the Allen screw (SW 3) clockwise.



4. Install the insert frame or plate.

4.5 Installing the Microscope

This procedure consists of the following steps:

Procedure

1. *Installing the microscope body [▸ 30]*.
2. *Installing the objectives [▸ 31]*.
3. *Installing the binocular tube [▸ 31]*.
4. *Installing the anti-glare shield [▸ 32]*.

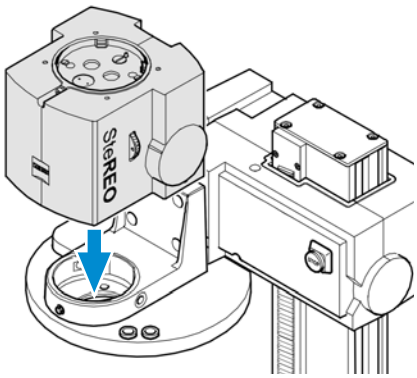
4.5.1 Installing the Microscope Body

Parts and Tools Hex key, 3.0 mm

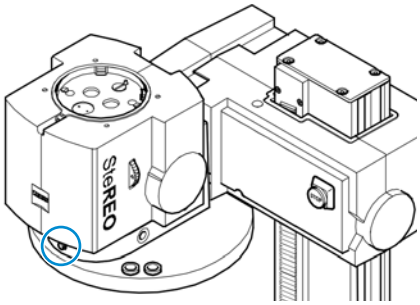
Prerequisite ✓ *The stand components are installed [▸ 27]*.

Procedure

1. Loosen but do not remove the clamping screw on the carrier or objective nosepiece.
2. Insert the microscope body into the mount.



3. Align the housing joint of the microscope body with the screw of mount S.
4. Tighten the screw.



5. *Assemble the objective [▸ 31]*.
6. *Assemble the binocular tube [▸ 31]*.

4.5.2 Installing Objectives

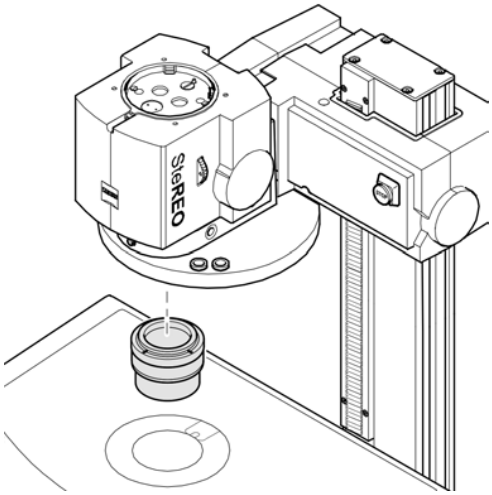
Parts and Tools Hex key, 3.0 mm

Prerequisite ✓ *The microscope body is assembled [▸ 30].*

Procedure

1. Install the shortest objective 1, then the medium one 2, and finally the longest one 3.

2. Take up the objective with both hands and screw it counterclockwise into the microscope body (upside down right-hand thread).



Proceed in the reverse order for removal.

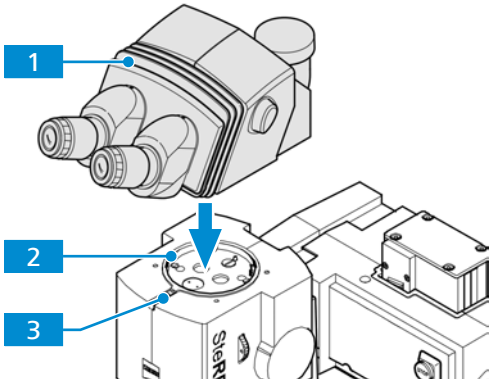
4.5.3 Installing the Binocular Tube

Parts and Tools Screwdriver, 3.0 mm, ball head

Prerequisite ✓ *The microscope body is assembled [▸ 30].*

Procedure

1. Insert the binocular tube 1 with the dove-tail ring into the tube mount 2.



2. Tighten the screw 3.

Proceed in the reverse order for removal.

Info

If *intermediate tubes [▸ 76]* are present, they must be installed between the microscope body and the binocular tube. Up to two intermediate tubes can be stacked.

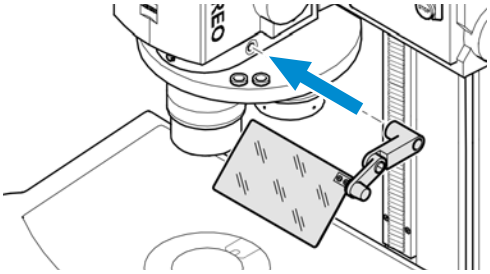
4.5.4 Installing the Anti-Glare Shield

Parts and Tools Screwdriver, 3.0 mm, ball head

Prerequisite ✓ *The stand components are installed [▸ 27].*

Procedure

1. Fix the anti-glare shield to the objective nosepiece turning the screwdriver clockwise.



2. Swing in the anti-glare shield to prevent dazzling during microscopic work.

4.6 Adjusting the Travel of the Motorized Focusing Drive

⚠ CAUTION

Crushing hazard due to moving parts

When moving the motorized focusing drive, fingers can be trapped in the stage.

- Do not reach into the operating area or under the motorized focusing drive.

NOTICE

Property damage due to collision of sample and objective

The objective and the sample can collide when lowering the motorized focusing drive.

- Adjust the lower limit switch after the first installation.
- Lower the motorized focusing drive only carefully unless the lower limit switch is adjusted.

4.6.1 Adjusting the Lower Limit Switch

Parts and Tools Screwdriver, 3.0 mm, ball head

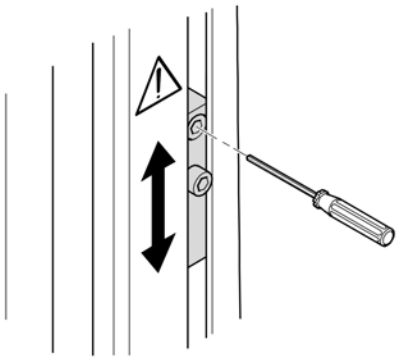
Prerequisite ✓ The microscope is operational.

✓ A printed sheet of paper is positioned on the stage.
When samples higher than 20 mm are to be examined, use the flattest sample instead.

Procedure

1. Release the lower limit switch and move it down as far as it will go.
2. Tighten the screw again.
3. When using the nosepiece, swing the longest objective into the beam path.
4. Carefully move the motorized focusing drive downwards until the sample is in focus - at first under direct observation and then while looking through the eyepieces.
   a Keep all moving microscope parts under observation to ensure that there is no collision with the sample, the stage, or the base plate.
5. Stop the motorized focusing drive.
6. Using the ball-headed screwdriver, push the lower limit switch upwards against the focusing drive until it engages.

7. Secure the lower limit switch in this position.

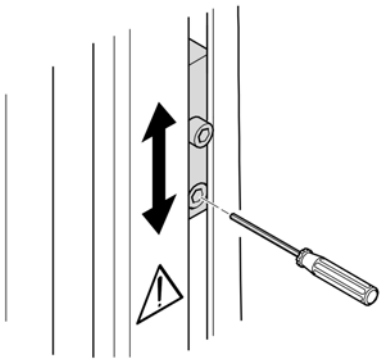


4.6.2 Adjusting the Upper Limit Switch

Parts and Tools
- Hex key, 3.0 mm

Prerequisite
- ✓ The microscope is operational.
- ✓ A printed sheet of paper is positioned on the stage.
  When samples higher than 20 mm are to be examined, use the flattest sample instead.

Procedure
1. Move the upper limit switch to the topmost position and secure it.
2. Move the focus drive carefully upwards to the highest focus position in which the microscope does not collide with objects in the proximity of the microscope.
3. Release the upper limit switch and lower it down against the focusing drive until it engages.
4. Secure the upper limit switch in this position.



4.7 Installing the Reflected Light Illumination

The reflected light illumination consists of the following components:
- *LED Ring Illuminator [▸ 33]*
- *Fiber-optical ring illuminators and LED ring illuminators [▸ 34]*
- *Flexible light guide with focusing attachment [▸ 34]*

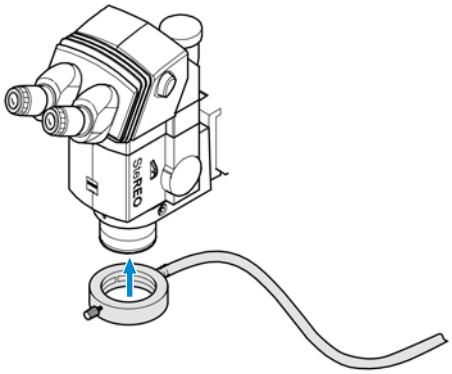
4.7.1 Installing the LED Ring Illuminator

Procedure
1. Push the LED ring illuminator onto the objective.
2. Tighten the knurled screw.

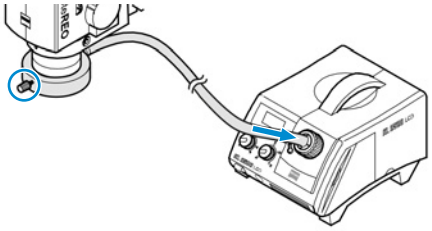
4.7.2 Installing the Slit-Ring Illuminator

Procedure

1. Push the slit-ring illuminator onto the objective.



2. Tighten the knurled screw.

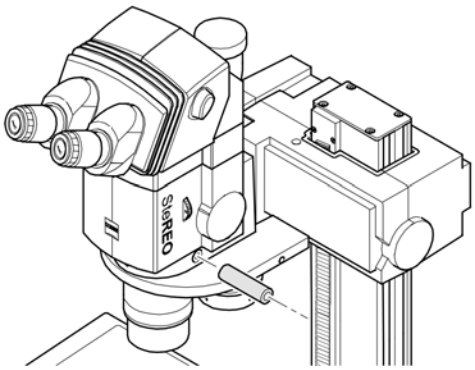


3. Connect the light guide to the cold-light source.

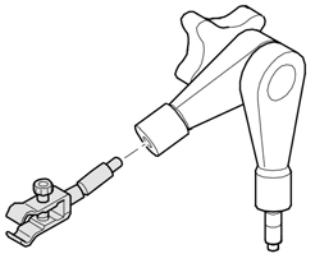
4.7.3 Installing the Flexible Light Guide with Focusing Attachment

Procedure

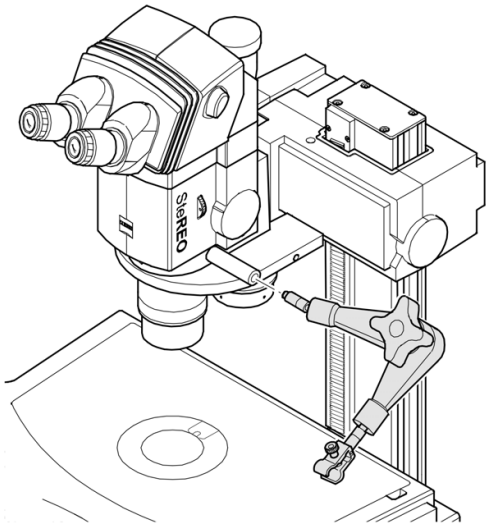
1. If required, fix the spacing rod.



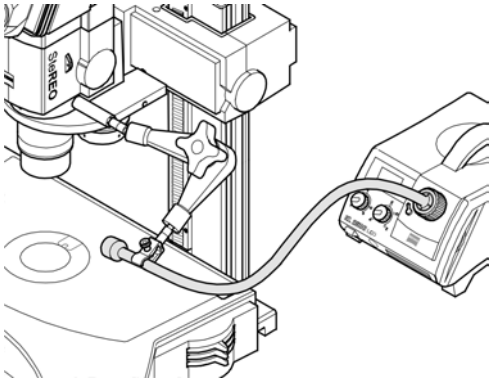
2. Hold the articulated arm in such a way that the label is correctly readable.
3. Fix the clamp for the light guide, the line light or the appropriate focusing attachment onto the upper end of the articulated arm.



4. Screw the bottom end of the articulated arm into the spacing rod or one of the tapped holes on the stand.



5. Tighten the tensioning screw on the articulated arm so that the latter can be used as lever.
6. Successively clamp the three joints of the articulated arm from bottom to top by means of the clamping screw; loosening the joints is in reverse order, i.e. from top to bottom.
7. Connect the light guide to the holding arm.
8. Connect the light guide to the cold-light source.



4.8 Installing Components onto the Objective Nosepiece S/doc

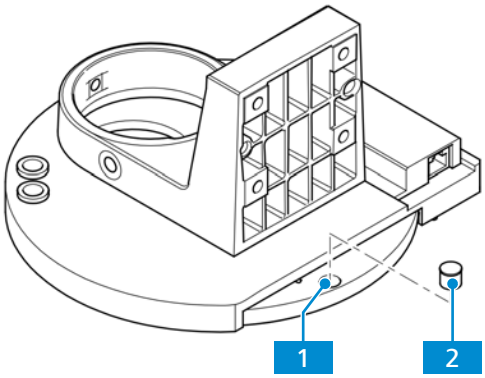
1. *Inserting the stoppers [▸ 36]*.
2. *Installing the objective nosepiece to the stand [▸ 27]*.
3. *Installing the microscope body [▸ 30]*.
4. *Installing the light guides [▸ 36]*.
5. *Installing the objectives [▸ 31]*.
6. *Installing the slit-ring illuminator without lightguide [▸ 37]*.

4.8.1 Inserting Stoppers into the Objective Nosepiece S/doc

The stoppers are required for closing light openings on objective positions which are not to be provided with a slit ring illuminator d = 66 mm without light guide. the openings must be closed prior to mounting the objective nosepiece to the stand.

Procedure

1. Rotate the nosepiece plate accordingly to make the light opening 1 of the corresponding nosepiece position accessible at the rear of the nosepiece.



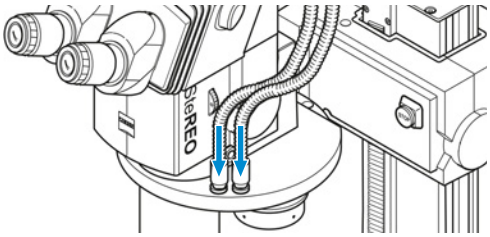
2. Put the stopper 2 from above into the light opening, with the taper hole of the stopper facing downwards.
3. *Install the objective nosepiece [▸ 27].*
4. **CAUTION During operation, the stoppers may become hot. Let the stoppers cool down for at least 5 minutes before removing them from the objective nosepiece.** To remove the stopper, lift it from below using a hex key 3 mm and remove it sideways. This is possible when the objective nosepiece is mounted on the stand.

4.8.2 Installing the Supply Light Guides

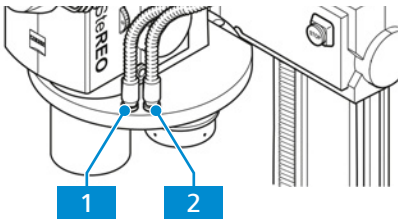
Prerequisite ✓ *The objective nosepiece is installed [▸ 27].*

Procedure

1. Insert the end-sleeve of the light guide into the corresponding light guide mount.



2. To avoid repositioning the light guide when changing between stereo and vertical positions, install a two-arm light guide 2x5.6mm/1000 or two single-arm light guides 1x8.0mm/1000 combined with two light sources.



   a Insert one light guide at the stereo position 1.
   b Insert one light guide at the macroscope position 2.
3. *Install the slit-ring illuminator without light guide [▸ 37].*

4.8.3 Installing the Slit-Ring Illuminator D = 66 mm without Light Guide

Special adapters are required to connect the slit-ring illuminator without light guide to different working heights caused by different objective lengths:

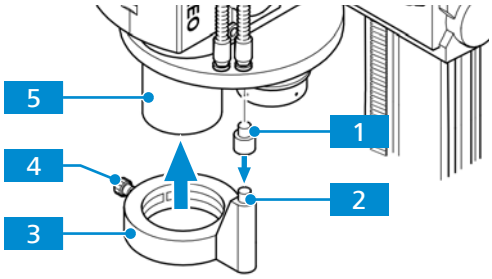
Objective	Light-conducting rod 13 mm	Light-conducting rod 51 mm	Spacing ring d = 66x16 mm for Achromat S
PlanApo S 0.63x	-	-	-
PlanApo S 1.0x	X	-	-
PlanApo S 1.5x	-	X	-
PlanApo S 3.5x mono	X	-	-
Plan S 1.0x	-	-	-
Achromat S 0.3x	-	-	X
Achromat S 0.5x	-	-	X
Achromat S 0.63x	-	-	X
Achromat S 1.0x	-	-	X
Achromat S 1.25x	-	-	-
Achromat S 1.5x	X	-	-

Prerequisite

- ✓ *The objectives are installed [▸ 31].*
- ✓ *The light guide is installed [▸ 36].*
- ✓ The spacer ring is screwed to the Achromat objective, if required.

Procedure

1. Put the appropriate light-conducting 1 rod onto the fiber input 2 of the slit-ring illuminator.



2. Put the slit-ring illuminator 3 from below onto the corresponding objective 5.
3. Push the slit-ring illuminator upwards until the light-conducting rod touches the mechanical stop in the corresponding hole at the underside of the objective nosepiece.
4. Fix the slit-ring illuminator with the knurled knob 4 in this position.

Proceed in the reverse order for removal.

4.9 Installing the Camera Adapter

Purpose The connection type "Interface 60N" is used for adapting the camera to the tubes of the microscope. The known adapters for "Interface 60" (inside diameter 30 mm), however, can also be used further on.

Microscope cameras (e.g. AxioCam of Carl Zeiss), customary SLR cameras (Single Lens Reflex; 35 mm film or digital) or compact digital cameras may be mounted to the camera port.

Info

With camera/adapter combinations that have not been recommended expressly by ZEISS, it may be quite impossible to obtain an unvignetted image.

Procedure

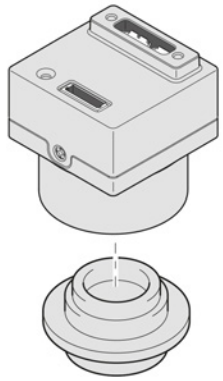
1. Follow the corresponding individual camera operating instructions when working with micro-photographic equipment.

4.9.1 Installing the Camera Adapter for Interface 60 (Plug-in Diameter 30 mm)

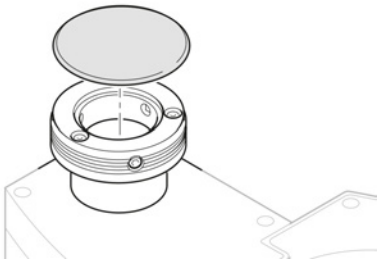
Parts and Tools Hex key, 3.0 mm

Procedure

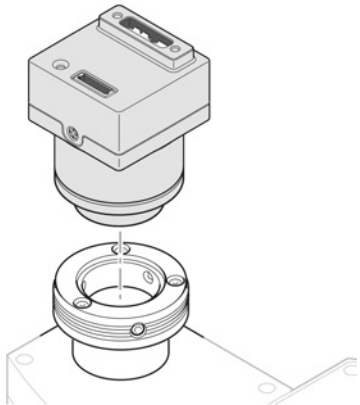
1. Mount the camera adapter 60 to the camera.



2. Remove the dust cap from the camera port.



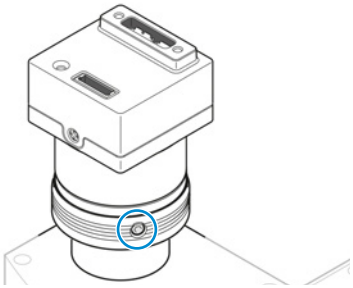
3. Set the pre-assembled unit on the camera port.



   a Ensure that the three screws do not project too far into the inner bore.

   b Retract as necessary.

4. Fix the adapter with the screw.

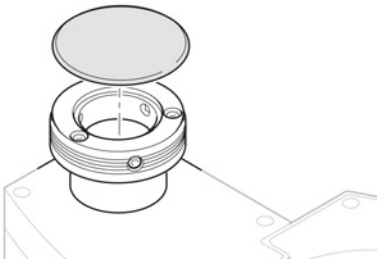


4.9.2 Installing the Camera Adapter for Interface 60N (External Thread M52 x 1)

Parts and Tools Hex key, 3.0 mm

Procedure

1. Mount the camera adapter 60N to the camera.
2. Remove the dust cap from the camera port.



3. Observe that the setscrew on the camera port does not project into either the external thread or the inner bore.
4. Connect the pre-assembled unit to the camera port, align and tighten the union nut of the adapter.

4.10 Installing the Human Interface Panel (HIP)

⚠ DANGER

Electric injury due to live parts

When the microscope is still switched on, coming in contact with live parts can lead to electric shock or burn.

- Switch off the microscope prior to installing and de-installing components.
- Disconnect live parts from the power supply.

NOTICE

NOTICE - Damage due to forcible twisting

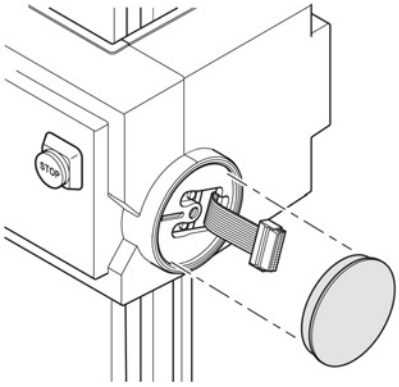
The HIP can be swivelled by about 30° around its longitudinal axis to achieve a convenient viewing angle. Forcible twisting may result in damage to the microscope.

- Be sure not to exceed the stated swivel range.

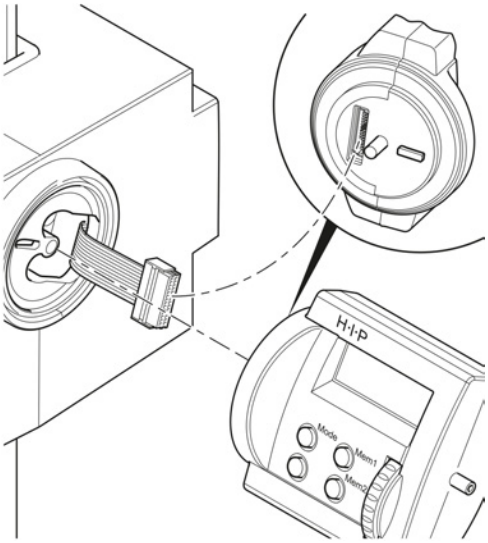
Parts and Tools Hex key, 3.0 mm

Procedure

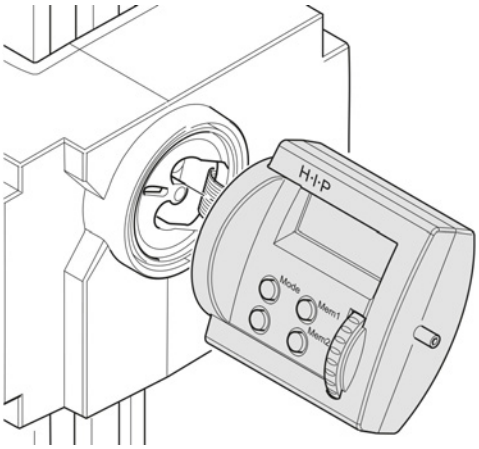
1. Remove the cover on the focusing drive or the microscope body.



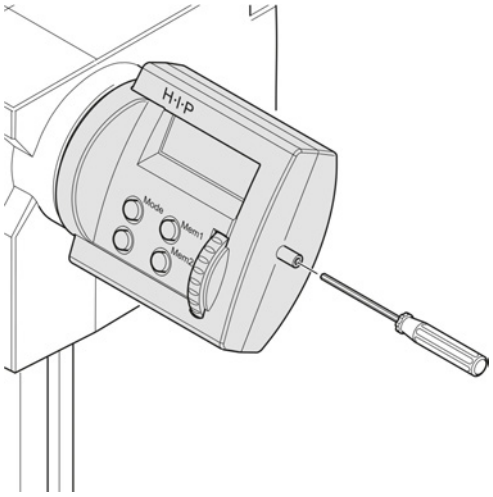
2. Pull out the connecting cable slightly without applying force.
3. Connect the cable carefully to the corresponding HIP connector socket.



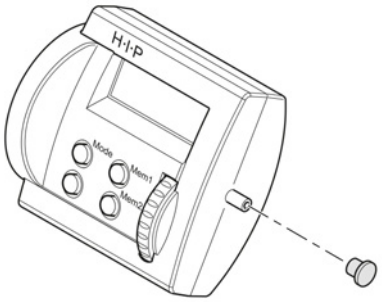
4. Push the cable fully back into the casing without bending it.
5. Carefully attach the HIP so that the nose on the HIP engages in the groove provided.



6. Screw in the socket head screw as far as it will go.



7. Push the cover cap onto the HIP.



4.11 Connecting the Human Interface Panel (HIP)

⚠ DANGER

Electric injury due to live parts

When the microscope is still switched on, coming in contact with live parts can lead to electric shock or burn.

- Switch off the microscope prior to installing and de-installing components.
- Disconnect live parts from the power supply.

⚠ CAUTION

Risk of burns due to hot power supply unit

- Only use one power supply unit to connect the CAN bus system of the microscope to the mains.
- The connection of two or more plug-in power supply units to the CAN bus system is expressly prohibited.
- The EMS 3 electronic module has an integrated power supply unit. No additional plug-in power supply unit must be connected when using the EMS 3.

Info

If there is no motorized focusing drive, connect the SteREO Discovery.V12/V20 microscope body directly to the mains via the plug-in power supply unit.

If the EMS 3 electronic module is present, connect the motorized focus drive to the EMS 3 module to establish the supply of power. Observe the separate instruction manuals.

Prerequisite

✓ The HIP is *installed [▸ 39]*.

✓ The microscope is switched off.

Procedure

1. Connect the microscope body to the motorized focusing drive via the 1 m long CAN cable (with RJ45 sockets).
2. Connect the motorized focusing drive to the mains via the provided plug-in power supply unit.
   a Connect the cable of the power supply unit to a RJ45 socket on the back of the motorized focusing drive.
   b Select the appropriate plug adapter (EURO, US, UK or AUS) and plug it into the power supply unit.
   c Connect the power supply unit to the mains power.

4.12 Wiring the Microscope

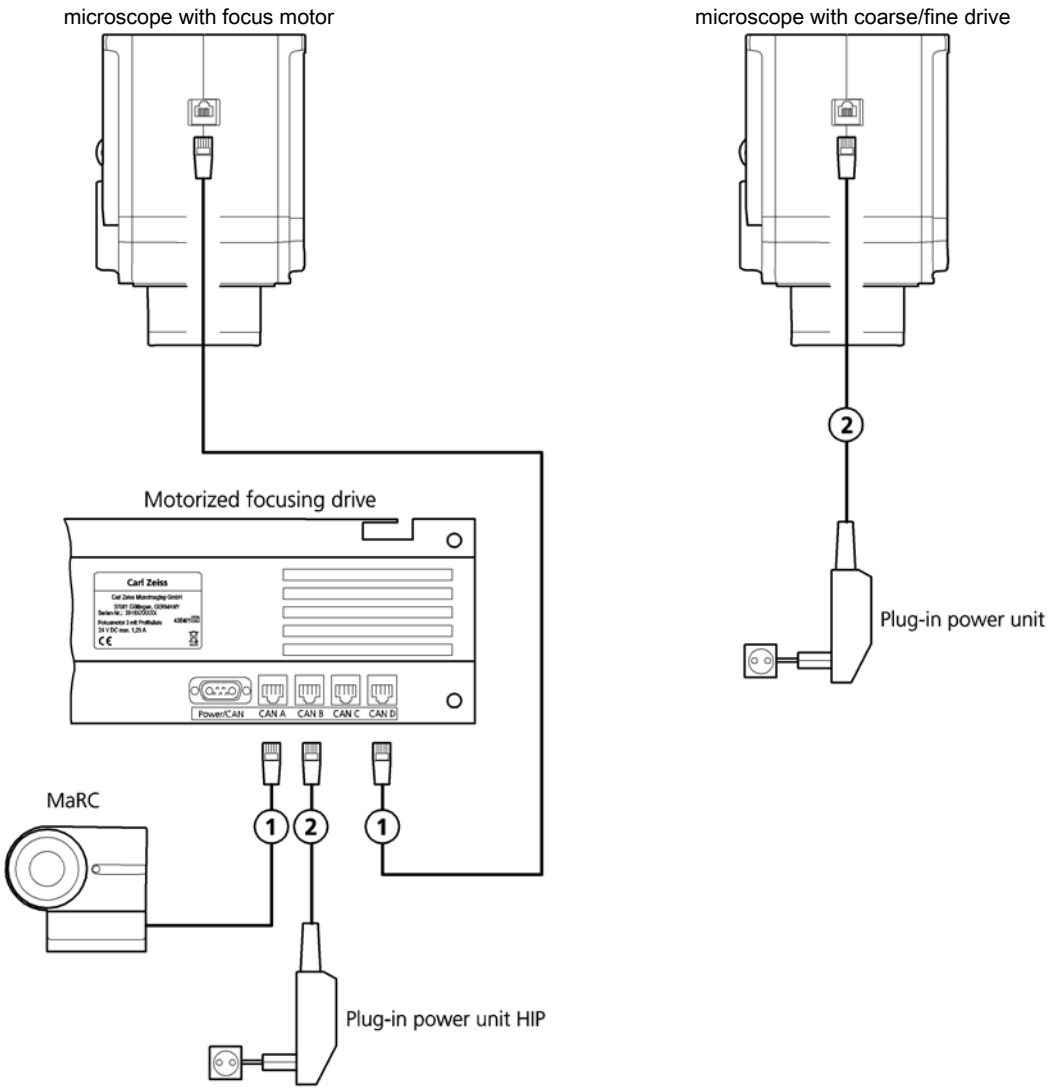
Do not switch the microscope on until all cables have been connected.

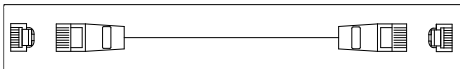
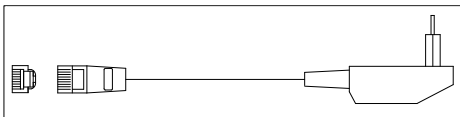
Info

In the absence of the motorized focusing drive (focus motor) each electronic CAN component can be operated with a separate PSU. In this case, the microscope body must be connected directly to the mains via the plug-in power supply.

Info

If two or more CAN components are connected to each other, only **one** power supply unit may be used.



No.	Name	Figure	Remarks
1	CAN cable RJ 45 Included with each CAN component		Connection between focus motor 3 and microscope body, and between focus motor 3 and MaRC L=500 mm or L=1000 mm
2	Plug-in power supply		Power supply to focus motor 3 or microscope body with coarse/fine drive

Procedure

1. Join the CAN bus connections of the CAN components used in any sequence to the **CAN A** to **CAN D** ports of the focusing drive.

5 Operation

This chapter describes switching on/off the microscope as well as the operating steps with the microscope.

Info

For additional information and detailed descriptions, refer to further applicable documents or ask your ZEISS Sales & Service Partner.

Info

Further information on the software and its operation is available in the software's online help.

5.1 Prerequisites for Commissioning and Operation

The following basic prerequisites are necessary for commissioning and operation:

- This document was read prior to commissioning or operation and kept for further use.
- The chapter **Safety** was read and understood.
- The operator is acquainted with the general Windows-based programs.
- If required: Basic training and safety briefing were successfully completed.

5.2 Switching On the Microscope

Prerequisite ✓ All components are connected and operational.

Procedure

1. If the motorized focusing drive is available, unlock the red **STOP** button at the front of the motorized focusing drive by pulling it out.
2. Briefly press the button ⏻ of the HIPs that are available. (on the microscope body and/or the motorized focusing drive).
3. Switch on the light sources (see separate instruction manuals).

5.3 Adjusting the Stereomicroscope

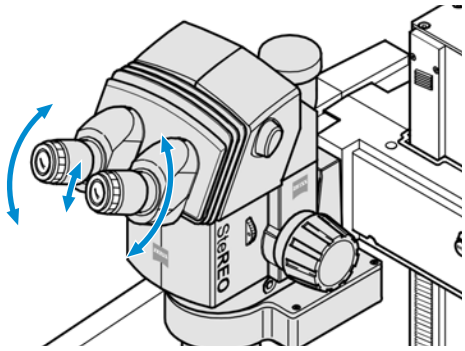
Prerequisite

✓ The microscope is switched on and ready for operation.

✓ The lower limit switch is *adjusted [▸ 32]*.

Procedure

1. Place a sample in the center of the object plate.
2. Switch on the illumination.
3. Fully open the aperture diaphragm in the microscope body by turning the knurled wheel all the way up.
4. Recheck that the eyepieces are fully inserted into the tube - up to the stop.
5. Adjust the diopter-setting ring on the eyepieces to "0".
   For eypieces without reticles set "0" to the white dot - with reticles set "0" to the red dot.
6. Adjust the interpupillary distance by turning the eyepiece tubes while looking through both eyepieces. Only one common circle of light should be visible with both eyes.
   In order to see only one circle of light when looking into the eyepieces, a distance of approx. 2 cm must be maintained between the eyes and the eyepiece.



7. Set the zoom to the smallest level of magnification.
8. Realign the illumination, if necessary.
9. Observe the sample through the eyepieces and focus on a prominent object detail in the center using the focusing drive.
10. Zoom in slowly while observing the sample. If the prominent detail gets off center or blurred, move it back to center and re-focus on it.
11. When the maximum zoom position is reached, precisely focus the prominent object detail again.
    → The correct focus plane is now determined. Do not move the focus knobs (or HIP focusing wheel) anymore in this procedure!
12. Set the minimum zoom again and observe the sample through both eyepieces.
13. Correct any image blurring in the left and in the right eye by turning the diopter adjustment ring of each eyepiece separately.
    → This establishes the parfocality of the Discovery Zoom and at the same time compensates for any defective vision.
14. To verify the parfocality, zoom up and down under visual observation through eyepieces. The object must remain in focus. Otherwise, repeat the basic setting procedure.
15. When using a microscope camera, the live image of the camera must also stay in focus. Otherwise, repeat the installation of the camera adapter and the camera.
16. If the user of the microscope changes (or puts on/off glasses), repeat the previous steps to restore the parfocality of the zoom and compensate for defective vision.

5.4 Adjusting the System Settings

Info

If the SteREO Discovery.V12/V20 with motorized zoom and the motorized focusing drive are used, the microscope is controlled and configured via the HIP control units.

One HIP on the microscope body controls the zooming and displays current optical parameters, the other HIP on the focus drive controls the focusing.

In addition to the HIPs, a *MaRC [▸ 58]* control unit can be used for particularly sensitive focusing and precise zooming. However, it is not suited to set system parameters.

If the Sycop 3 is present, all parameters must be adjusted via the Sycop 3. The setting mode of the HIPs is not accessible in this case.

5.4.1 Setting Zoom and Focus Parameters Using the HIP Units

To ensure that the HIP on the microscope body displays the correct magnification and optical parameters, the HIP settings must be adjusted before using the microscope for the first time.

Procedure

1. Enter the setting mode of the HIP by pressing the **MODE** button for longer than two seconds.
   → A confirmation signal will sound.
2. Toggle through the system parameters by briefly pressing the **MODE** button several times.
   → The required system parameter is active for setting when it is shown in the upper line of the display.
3. Set the desired parameter values by moving the knurled wheel of the HIP up/down several times.
4. Proceed in the same way to set other system parameters: First select them by briefly pressing the **MODE** button and then set the desired parameter value by moving the HIP wheel.
5. Once you have set all the system parameters as required, save the settings and exit the setting mode by pressing the **MODE** button for longer than two seconds.
   → A confirmation signal will sound.
6. To ensure that the HIP displays correct values of the total magnification and the other optical parameters, set the following system parameters:
   set lens - select the currently installed objective lens
   set eyepiece - select the currently installed eyepiece type
7. Set the other system parameters according to your personal preferences: **zoom speed**, **backlight**, and **beep level**.
8. In the same way, set the system parameters of the HIP on the motorized focusing drive according to your personal preferences: **focus speed**, **backlight**, and **beep level**.

5.5 Adjusting the Reflected Light Illumination

Prerequisite ✓ *The reflected light illumination is installed [▸ 33]*.

Procedure

1. Switch on the cold-light source for reflected light (RL).
2. Adjust the light guide to the sample.
3. Use the cold-light source to adjust the illumination intensity as required.

5.6 Acquiring an Image

Prerequisite

- ✓ The microscope is switched on and ready for operation.
- ✓ The mechanical stops of the motorized focusing drive are *adjusted [▸ 32]*.
- ✓ The microscope is *adjusted [▸ 45]*.
- ✓ The illumination is switched on.

Procedure

1. Place the sample on the center of the round object plate, respectively on the stage plate.
2. Sharply focus on the sample.
3. Re-adjust the illumination, if necessary.
4. Move the sample until the region of interest is visible through the eyepieces. Use the mechanical stage, the gliding stage, and/or the ball-and-socket stage for precise sample adjustment.
5. Set the maximum zoom value.
6. Re-focus on the sample.
7. Re-adjust the illumination, if necessary.
8. Zoom down to the desired magnification level.
   → The sample detail stays sharp in focus.

5.7 Switching Off the Microscope

Procedure

1. On the HIP, briefly press the ⏻ button.
2. Disconnect the plug-in power unit from the mains power supply.
3. Set the toggle switch(es) on the cold-light source(s) used to **O**.
4. If LED illuminators are used, set their on/off switches to **O**.
5. Protect the microscope using a dust cover.

6 Care and Maintenance

To ensure the best possible performance of the microscope and its components, maintenance must be performed on a regular basis. Keep the service logs of the microscope.

To maintain operational safety and reliability of the microscope, we recommend entering into a **ZEISS Protect Service Agreement**.

Info

For additional information and detailed descriptions, refer to further applicable documents or ask your ZEISS Sales & Service Partner.

6.1 Maintenance Schedule

The recommended intervals for maintenance depend on the total uptime of the microscope.

Interval	Part/Component	Activity
If required	Motorized focusing drive	*Adjust the limit switches [▸ 32].*
If required	Manual focusing drive	*Adjust the torque [▸ 51].*

6.2 Care and Cleaning Work

To ensure the best possible performance of the microscope and its components, maintenance must be performed on a regular basis. Keep the service logs of the microscope.

To maintain operational safety and reliability of the microscope, we recommend entering into a **ZEISS Protect Service Agreement**.

⚠ DANGER

Electric injury due to live parts

When the microscope and its components are still switched on, coming in contact with live parts can lead to electric shock or burn.

- Switch off the microscope and its components prior to opening or cleaning.
- Disconnect live parts from the power supply.

NOTICE

Functional impairment due to dirt and moisture

Dirt, dust, and moisture can impair the microscope functionality and can cause short-circuits.

- Use the dust protection cover if the microscope is not used.
- The ventilation slots must be unobstructed at all times.
- Perform regular maintenance and cleaning according to the instructions in this document and according to the instructions in the applicable documents.
- Make sure that no cleaning liquid or moisture gets inside the microscope and its components.
- In case of damage, the affected parts of the microscope must be taken out of operation.

6.2.1 Cleaning an Optical Surface

NOTICE

Damage of optical surfaces due to improper cleaning

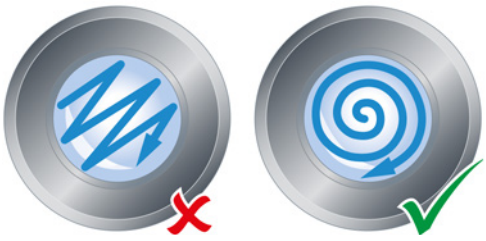
- Remove dust from the optical surface slowly and carefully.
- Remove dust on optical surfaces with a natural-hair brush or blow it off with a rubber bellows.
- Avoid touching optical surfaces with fingers.

Parts and Tools

- Clean cloth
- Cotton swab
- Optical cleaning solution
- Lint-free cloth

Procedure

1. Moisten a cotton swab or a clean cloth with an optical cleaning solution, if necessary.
2. Wipe optical surfaces in a circular motion towards the edge of the optics with slight pressure.



3. Dry with a lint-free cloth.

6.2.2 Removing Water-Soluble Contamination

NOTICE

Damage of the microscope due to wrong solutions or solvents

During cleaning, incorrectly used or wrong solutions/solvents can harm the microscope.

- Test clean solutions of unknown composition first on a less visible area of the unit.
- Use only tested solutions/solvents.

Parts and Tools

- Clean cloth
- Lint-free cloth

Prerequisite

✓ The microscope and it's components are switched off and disconnected from the power supply.

Procedure

1. Remove dust and loose dirt particles with a soft brush or clean lint-free cloth.
2. If necessary, moisten a clean cloth with water.
   → Stubborn dirt can be cleaned with all commercially available water solutions, benzine or alcohol (no solvent!). For cleaning coated parts, use a linen or leather cloth that is moistened with one of these substances.
   Info Labels on the device may only be cleaned using a dry cloth.
3. Wipe off the area with the cloth.
4. Dry with a lint-free cloth.

7 Troubleshooting

The following table provides information about solving common problems.

Info

If you cannot solve the problem or if you are unsure about a certain technical difficulty, contact your local ZEISS service representative.

Symptom	Cause	Measure
The manual focusing drive moves down by itself.	Focus drive is set too light / torque setting is too low to bear the load on the carrier or the nosepiece	*Increase the torque of the manual focusing drive [▸ 51].*
The coarse focusing knob of the manual focusing drive can only be turned with great effort.	The focusing drive is set too stiff / the torque setting is too high.	*Decrease the torque of the manual focusing drive [▸ 51].*
The coarse focusing knob can only be turned with great effort - but if the torque is reduced, the focusing drive moves down by itself.	The total load on the carrier or on the nosepiece is more than 10 kg.	Use the motorized focusing drive.
The HIP cannot be switched on by pressing ⏻ button.	Mains supply interrupted.	Check and restore mains supply.
	HIP not correctly installed.	Check and *re-connect the cables [▸ 41]* of the motorized focusing drive, or the microscope body, to the connector socket of the HIP.
	The plug-in power supply is not properly connected to the motorized focusing drive, or the microscope body.	Re-connect the plug-in power supply to the motorized focusing drive, or the microscope body.
The HIP cannot be switched on/off by pressing the ⏻ button. The setting mode cannot be accessed by a long press on the **MODE** button.	The EMS3 electronic module and SYCOP control panel have taken control of the microscope.	Switch the microscope on/off using the SYCOP. Change the system settings via SYCOP.
The microscope is switched on, but focusing with HIP or MaRC is not possible.	The **STOP** button on the motorized focusing drive is pressed.	Unlock the **STOP** button by pulling it out.

Symptom	Cause	Measure
The zoom or focus buttons of the MaRC rotary control unit show unexpected behavior.	MaRC has lost data connection to the microscope body.	The microscope is switched on (both HIPs). Unplug the cable of the MaRC from the motorized focusing drive and plug it in again.
		Alternatively switch off the microscope (both HIPs) and unplug it from mains power. Then plug in and restart the microscope.
The HIP for zoom control does not show correct magnification or other optical values.	Parameter settings (lenses and eyepieces) in the HIP not set correctly.	*Enter setting mode of the HIP and set correct parameters [▸ 46]*.
The visual image becomes blurred while zooming.	Focus plane not set correctly.	*Adjust the microscope [▸ 45]*.
	Defective vision not compensated properly.	*Adjust the microscope [▸ 45]*.
The camera live image becomes blurred while zooming.	Focus plane not set correctly.	Focus an object detail in maximum zoom position. It must stay sharp when zooming down.
	Camera adapter not installed properly.	*Re-install the camera adapter [▸ 38]*.
Unexpected focusing up/ down (SYCOP or foot pedal present).	Foot pedal for focusing accidentally pressed.	Release the foot pedal.
	SYCOP joystick accidentally deflected.	Release the joystick.

7.1 Adjusting the Torque of the Manual Focusing Knob

Info

With a coarse/fine drive with column 490 mm the torque-adjusting ring is on the right-hand focusing knob, with a coarse/fine drive with column 350 mm it is on the left focusing knob.

Parts and Tools

- Hex key, 3.0 mm

Procedure

1. Insert the hex key into one of the boreholes on the torque-adjusting ring.
2. Hold the coarse-focusing knob and turn the torque-adjusting ring clockwise (increased torque) or counter-clockwise (decreased torque) until you reach the desired level.
3. Remove the hex key.

8 Decommissioning and Disposal

This chapter contains information on the decommissioning and disposal of the microscope and its expansions/components or accessories.

8.1 Decommissioning

If the microscope and its components are not used for an extended period of time such as several months, they should be shut down completely and secured against unauthorized access.

⚠ DANGER

Electric injury due to live parts

When the microscope and its components are still switched on, coming in contact with live parts can lead to electric shock or burn.

- Switch off the microscope and its components prior to opening or cleaning.
- Disconnect live parts from the power supply.

Procedure

1. *Switch off the SteREO Discovery [▸ 47]*.
2. Unplug all separately controllable electronic components.
3. Pull the mains plug.

8.2 Transport and Storage

The following regulations must be observed before and during transport:

- Use devices (e.g. handles, fork lifts or hand pallet trucks) to transport the microscope safely to the installation room. The microscope may only be transported in air-suspended vehicles. Devices for transporting the microscope must be rated to handle its full weight and dimensions.
- Moving parts must be secured during transport to prevent them from slipping or tipping over.
- Avoid rocking the transport boxes back and forth.
- Note the weight information on the package and on the shipping document.
- Where possible, the original packaging must be used for shipping or transport.

Maximum shock resistance

- Do not drop or bump the boxes during movement or storage. Acceleration must not exceed 10 g.
- Evaluate packaging shock and tilting sensors on delivery and after internal transport.

Allowable Temperature

Allowable temperature during transportation to or between sites:

- Between -40 °C and 70 °C

Allowable temperature during storage at site:

- Between 10 °C and 40 °C
- Relative humidity less than 75 % at 35 °C

Info

24 hours before installation of the microscope it is required that the boxes are at recommended room temperature to avoid ingress of humidity, which is harmful to optical paths, and to ensure effective stability of the microscope during installation and testing.

Info

Detailed information on transport and storage is available from your ZEISS Sales & Service Partner.

8.2.1 Weight and Sizes of the Transported Goods

For the weight and dimensions of the shipment crates for your specific microscope configuration, contact your ZEISS Sales & Service Partner.

Box	Approx. Length (mm)	Approx. Width (mm)	Approx. Height (mm)	Approx. Weight (kg)
Pallet box	800	600	1000	35-60
Pallet box for large system configurations	1200	800	1000	≤ 100

8.2.2 Transporting over Short Distances

⚠ CAUTION

Muscle strains and back injuries due to heavy weight

The microscope is heavy. Wrong handling, e.g. lifting alone, might lead to injuries or damage the microscope.

- Organize an assistance for transportation.
- Only transport the microscope over short distances, i.e. within the same building.
- Use the supplied grip holders for lifting or transporting the microscope.
- Do not attempt to grab the microscope anywhere else for lifting or transporting the microscope.
- Transport of the microscope over long distances may only be performed by the ZEISS service representative.

For relocating the miroscope within a laboratory, follow this procedure:

Procedure

1. Move the focusing drive down to its bottom mechanical stop.
2. *Switch off the microscope [▸ 47]*.
3. Disconnect all cable connections.
4. Pull the mains plug.
5. *Remove the binocular tube [▸ 31]*.
6. Remove the intermediate tube.
7. *Remove objectives [▸ 31]*.
8. *Remove the microscope body [▸ 30]*.
9. *Remove the transmitted-light equipment S [▸ 68]*.
10. Taking the microscope by the recessed grip wells at the stand base, lift it up and carry it.
11. Reinstall the disassembled components.
12. Establish all cable connections correctly.
13. Switch on the microscope.

8.3 Disposal

The microscope and its components must not be disposed of as domestic waste or through municipal disposal companies. They must be disposed of in accordance with applicable regulations (WEEE Directive 2012/19/EU). ZEISS has implemented a system for the return and recycling of devices in member states of the European Union that ensures suitable reuse according to the EU Directives mentioned.

ZEISS introduced a procedure for the return and recycling of the instruments within the member states of the European Union which ensures suitable recycling procedures conforming to the EU directives.

For more information on disposal and recycling please consult your ZEISS Sales & Service Partner. The microscope may not be disposed of in the household waste or through municipal waste disposal services. If the microscope is resold, the seller shall be obliged to inform the buyer that the microscope must be disposed of in accordance with the regulations.

The customer is responsible for decontamination.

8.4 Decontamination

A decontamination statement must be submitted before returning any used objects to the ZEISS location.

If reliable decontamination cannot be guaranteed, the hazard must be marked according to applicable regulations. In general, a well-visible warning sign must be affixed to the article itself and to the outside of the packaging, together with detailed information on the type of contamination.

9 Technical Data and Conformity

This chapter contains important technical data as well as information on the conformity.

9.1 Performance Data and Specifications

Weight and Sizes

The table below gives some indication on the approximate weight and sizes of the unpacked items.

Main Components	Width (mm)	Depth (mm)	Height (mm)	Weight (kg)
SteREO Discovery.V8	450	433	521	≥ 25 kg
SteREO Discovery.V12 SteREO Discovery.V20	594	457	520	≥ 30 kg

Location requirements

The microscope may only be operated in closed rooms. The microscope should not be installed near radiators or windows with direct sunlight. The microscope must be placed securely on the table surface to prevent slipping and falling.

Compliance with the installation requirements of the microscope and the availability of the requested supplies is the responsibility of the customer and has to be readily available at the time of installation.

Installation site	Exclusively inside buildings
Altitude	Max. 2000 m above sea level
Atmospheric pressure	Min. 800 hPa

Air Conditioning and Quality

	Value
Temperature range for operation with indicated performance (24 h per day, regardless of whether the microscope is in operation or switched off)	+10 to +40 °C
Temperature range for operation with X-Cite XYLIS II	+15 to +30 °C
Relative humidity	< 75 % at 30°C
Atmospheric pressure	800 to 1060 hPa
Pollution degree	2

Mains connection

The microscope must be plugged into a properly installed power socket with protective earth contact using the supplied mains cable. The protective earth connection must not be impaired by the use of extension cables.

	Value
Nominal AC voltage	L+N+PE 100 to 240 VAC ± 10 %
Nominal frequency	50 - 60 Hz
Main Power Plug	Local mains plug will be supplied.

	Value
Power consumption	max. 700 mA
Protection class	IP40 (IEC 60529)
IEC earth class	Class 1 of IEC 61140 All chassis are connected to electrical earth by the earth cable in the mains cable.
Overvoltage Category	II
Output voltage	24 VDC stabilized: 1.25 A, 30 W

9.2 Applicable Standards and Regulations

The SteREO Discovery is a product for research purposes only. It conforms to current international standards as well as to harmonized standards of the applied EU directives.

The SteREO Discovery complies with the following EU directives:

2011/65/EU and delegated directive (EU) 2015/863	Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS), amended by Commission Delegated Directive (EU) 2015/863 of 31 March 2015
2012/19/EU	WEEE Directive
2014/30/EU	Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility
2014/35/EU	Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits
(EC) No 1907/2006	Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
EN IEC 61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements IEC 61010-1:2010 in consideration of CSA and UL directives

Not for therapeutic use, treatment, or medical diagnostic evidence. Not all products are available in every country. Observe all general and country-specific safety regulations as well as applicable environmental protection laws and regulations.

ZEISS conforms to the following management system standards: ISO 9001, ISO 13485, ISO 14001, and ISO 50001.

9.3 Declaration of China RoHS

关于电器电子产品有害物质限制说明

Microscopes and accessories of the Carl Zeiss Microscopy GmbH are in compliance with the China RoHS Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) SJ/T 11364 with respect to lead, mercury, cadmium, hexavalent chromium, poly-brominated biphenyls (PBB) or polybrominated diphenylethers (PBDE) content.
兹证明，根据中国电器电子产品有害物质限制使用管理办法，我司产品符合中国对电器电子产品中含铅及其化合物、汞及其化合物、镉及其化合物、六价铬化合物、多溴联苯、多溴二苯醚六种有害物质的法规要求。

The toxic substances or elements
有毒有害物质或元素

	Lead (Pb) 铅	**Mercury (Hg) 汞**	**Cadmium (Cd) 镉**	**Hexavalent chromium (Cr6+) 六价铬**	**Polybrominated diphenyl ether (PBB) 多溴联苯**	**Polybrominated diphenyl ether (PBDE) 多溴二苯醚**
Cable 电线	x	o	o	o	o	o
Electronical Parts 电子电路	x	o	x	o	o	o
Optical Parts 光学部件	x	o	o	o	o	o
Mechanical Parts 机械部件	x	o	x	o	o	o
Lamps 灯	x	x	x	o	o	o

o = Indicates that this toxic or hazardous substance contained in the homogeneous materials for this part, is below the limit requirement in GB/T 26572 .
表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572 规定的限量要求以下。

x = Indicates that this toxic or hazardous substance contained in the homogeneous materials for this part, is above the limit requirement in GB/T 26572 .
表示该有害物质至少在该部件某一均质材料中的含量超出GB/T 26572 规定的限量要求。

10 Accessories and System Expansions

Only the following accessories may be used with the microscope as their safe use has been confirmed by ZEISS. Only original parts from ZEISS may be used. Check in advance whether your microscope can be retrofitted with a system expansion or accessories.

After installation or conversion it must be carefully checked whether the microscope and its system expansions/accessories are in a safe operational state and whether unused ports are closed. For details and safety measures refer to the associated documents.

Info

For additional information and detailed descriptions, refer to further applicable documents or ask your ZEISS Sales & Service Partner.

10.1 Manual Rotary Control (MaRC)

Function MaRC is used to operate the motor focus and zoom functions of the microscope.

Position It can be mounted either directly on the focusing drive or as a table-top version with table-top base independently of the microscope. The MaRC can also be mounted on the body of the microscope instead of the HIP.

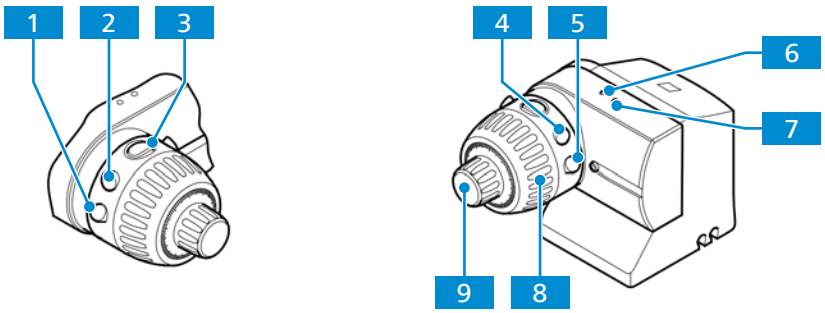


Fig. 10: Controls and functional elements of MaRC

1	Key 1	2	Key 2
3	Key 3	4	Key 4
5	Key 5	6	Green LED
7	Blue LED	8	Coarse adjustment knob
9	Fine adjustment knob		

MaRC offers the following scope of functions:

- Control of focus motor by using the coarse adjustment knob and the fine adjustment knob.
- Precise zoom to the next zoom clickstop position - short press of keys 1 and 2
- Quick zooming in and zooming out by means of a pair of keys – long press of keys 1 and 2
- Quick focusing upwards and downwards by means of a pair of keys – long press of keys 4 and 5
- Storing a focus position – key 3
- Travel to the stored position – key 3
- Reversing the sense of rotation of the MaRC unit – key 3

10.1.1 Installing the MaRC on the Microscope Body or the Motorized Focusing Drive

⚠ DANGER

Electric injury due to live parts

When the microscope is still switched on, coming in contact with live parts can lead to electric shock or burn.

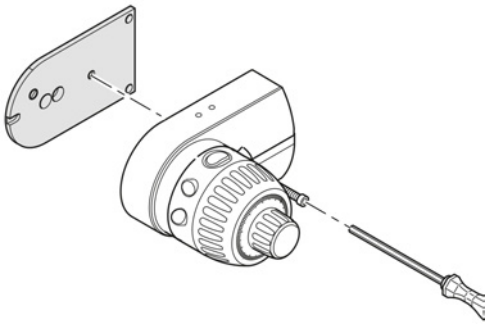
- Switch off the microscope prior to installing and de-installing components.
- Disconnect live parts from the power supply.

Parts and Tools

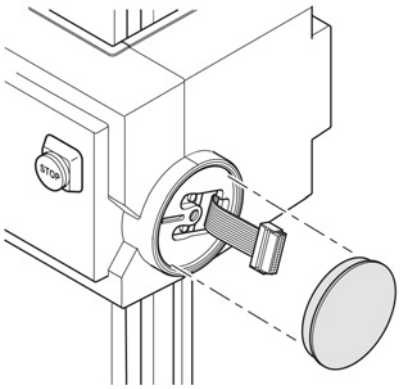
- Hex key, 3.0 mm

Procedure

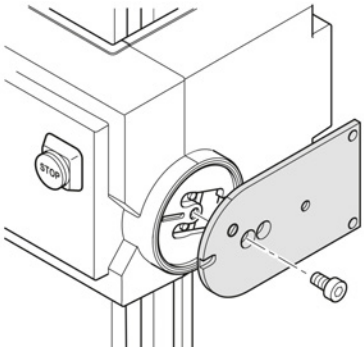
1. Loosen the socket head screw on the MaRC.
2. Remove the mounting plate from the MaRC.



3. Remove the cover on the focusing drive or on the microscope body. Ensure that the connecting cable remains completely inside the housing.

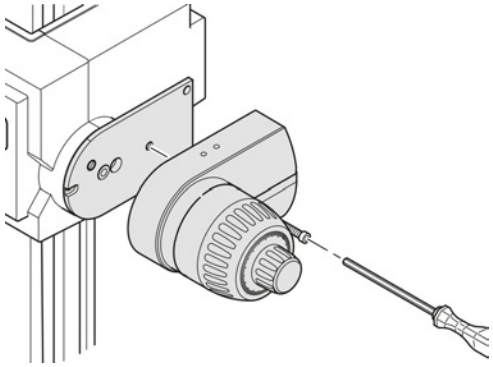


4. Attach the mounting plate with a screw securely to the flange of the focusing drive.



   a Insert the screw into the left hole of the mounting plate.
   b Ensure that the orientation pin on the rear side of the mounting plate is seated in the groove provided.

5. Screw the MaRC to the attached mounting plate.



6. Plug the CAN cable RJ 45 into one of the two CAN bus ports on the MaRC (base) and connect it to the motorized focusing drive.

10.1.2 Installing the MaRC on the Table-Top Base

⚠ DANGER

Electric injury due to live parts

When the microscope is still switched on, coming in contact with live parts can lead to electric shock or burn.

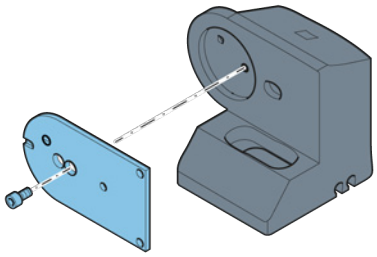
- Switch off the microscope prior to installing and de-installing components.
- Disconnect live parts from the power supply.

Parts and Tools

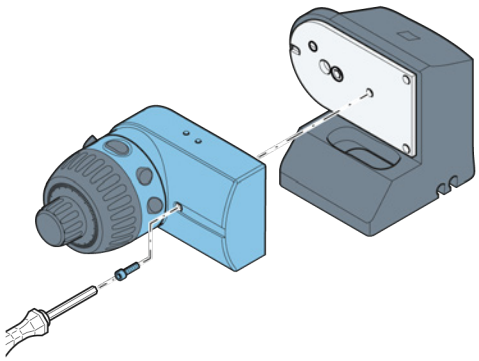
- Screwdriver, 3.0 mm, ball head

Procedure

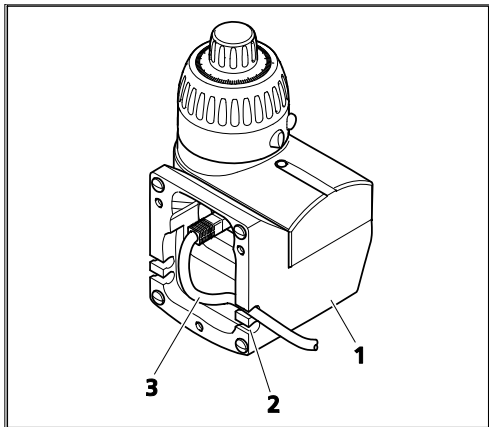
1. Insert the screw into the right hole of the mounting plate.



2. Secure the mounting plate with screw on the table-top base.
3. Screw the MaRC to the attached mounting plate with a socket head screw using a ball-head screwdriver.



4. Plug the CAN cable RJ 45 (**3**) into one of the two CAN bus ports of the MaRC (through the underside of the table-top base, and connect to the motorized focusing drive.



5. Pull the CAN cable RJ 45 to the outside through one of the two cut-outs (right or left, **2**).
6. Place the table-top base with MaRC beside the microscope to the right or left.

10.1.3 Switching on MaRC

Procedure

1. To switch on the MaRC, connect it to the motorized focus drive via CAN cable. The MaRC is switched on as soon as the motor focus drive is connected to the mains power (e.g via plug-in power supply unit).
   If an EMS 3 electronic module is present and properly connected via CAN bus, the whole microscope including MaRC is switched on by switching on the EMS 3 module.

↳ After power ON, the stored focus position will remain unchanged, provided a focus position was stored and MaRC was switched off properly the last time it was used. If it was not switched off properly, the switch-on focus position will be set as stored value.

↳ If a focus motor ready for operation is connected, the blue LED will light up.

↳ MaRC is immediately ready for operation.

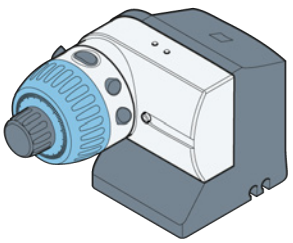
10.1.4 Controlling the Focus Motor

Info

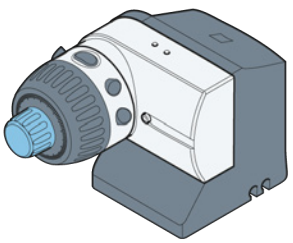
If a motorized zoom body is used, the sensitivity of the coarse/fine drive depends on the set zoom magnification and configured objective.

Procedure

1. To control the focus motor quickly, turn the coarse adjustment knob clockwise or counter-clockwise.



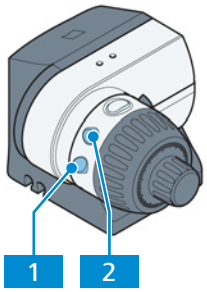
2. To control the focus motor slowly, turn the fine adjustment knob clockwise or counterclock-wise.



10.1.5 Travelling to Zoom Click Stop Positions

Procedure

1. Briefly (≤ 200 ms) press key 1 or 2 to travel the zoom body to the next lower or higher click stop position.



→ A click stop counter will be incremented if key 2 is pressed briefly several times.

→ A click stop counter will be decremented if key 1 is pressed briefly several times.

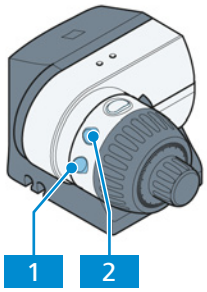
→ The click stop travel of the zoom body starts 200 ms after the last keystroke.

↳ Travel will stop exactly at the magnification level indicated on the HIP panels according to the current objective/eyepiece combination.

10.1.6 Fast Zooming In or Out

Procedure

1. Press key 1 or 2 for > 200 ms to start moving the zoom body.



→ At first the speed will increase linearly with the duration of the keystroke until the maximum speed is reached.

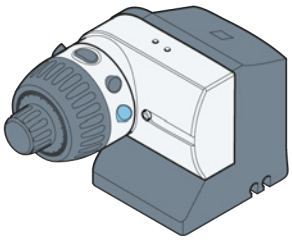
Info The attainable maximum speed depends on the currently active speed profile set via HIP.

↳ It will not stop until the respective key is released or the limit position is reached.

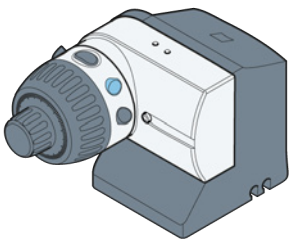
10.1.7 Fast Focusing Upwards or Downwards

Procedure

1. Press the lower key to move the motor control upwards.



2. Press the upper key to move the motor control downwards.



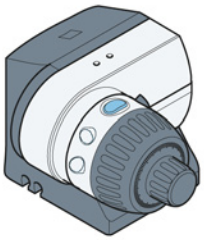
→ At first the speed will increase linearly with the duration of the keystroke until the maximum speed is reached.
Info The attainable maximum speed depends on the currently active speed profile set via HIP.

↳ It will not stop until the respective key is released or the limit position is reached.

10.1.8 Saving a Focus Position

Procedure

1. To store the current focus position press the key for 2 to 5 seconds.

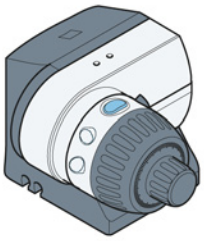


↳ The green LED will briefly light up and one short beep tone on the motorized focusing system issued to indicate completion of the storing process after 2 seconds.

10.1.9 Traveling to the Saved Focus Position

Procedure

1. To travel the motor to the stored focus position, press the key for < 2 seconds.

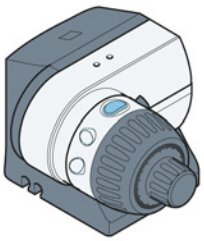


10.1.10 Reversing Rotation of MaRC

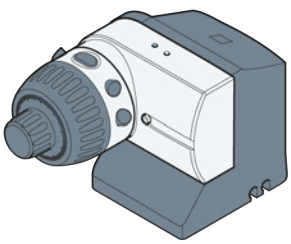
Reversal of the direction of rotation means that the MaRC control unit can be mounted and operated either to the right (for right-handed persons) or to the left of the microscope (left-handed persons).

Procedure

1. To reverse the direction of rotation, press the key for more than 5 seconds.



→ First of all, a single beep tone will be issued.
→ Then two tones will be issued and the green control lamp will flash once or twice.



↳ The reversal has been completed.

10.2 PentaFluar S Vertical Illuminator

Position The PentaFluar S vertical illuminator is mounted directly on the microscope body, below the binocular tube. If desired, a further intermediate tube can be mounted above the PentaFluar S vertical illuminator.

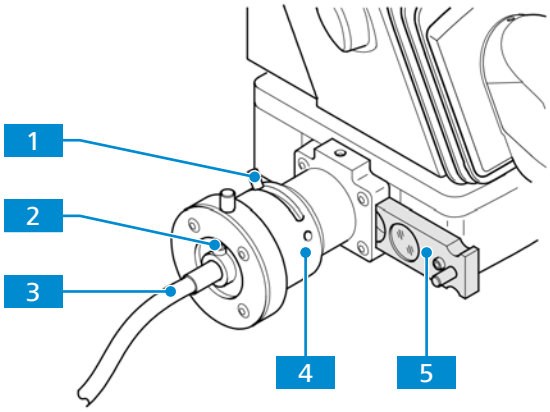


Fig. 11: Controls of the PentaFluar S vertical illuminator

1	Lever to open/close the diaphragm	2	Clamp screw
3	Optical fiber	4	Mounting port
5	Filter slider		

Function The filter slider 5 has the following functions:

- Pulled out: blocking position
- Middle position: free aperture, working position
- Pulled in: additional filter BG38 for attenuation of a possible reddish background

The PentaFluar S vertical illuminator can be combined with the following fluorescence excitation illuminators:

- HXP 120 V
- HXP 200
- X-Cite XYLIS II
- Viluma 9

10.2.1 Labels on the PentaFluar S Vertical Illuminator

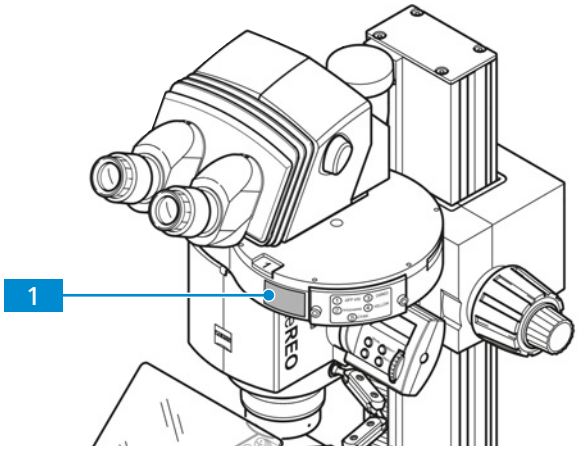
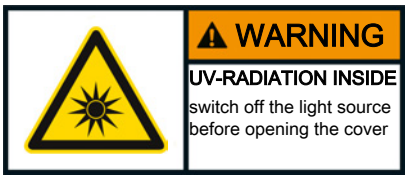


Fig. 12: Labels on the PentaFluar S vertical illuminator

Pos.	Label or light	Explanation
1		Warning: UV-radiation inside Switch off the light source before opening the cover.

10.2.2 Installing the PentaFluar S Vertical Illuminator

NOTICE

Install the PentaFluar S directly on top of the microscope body. If an additional intermediate tube is required, ensure that it is installed above the PentaFluar S vertical illuminator.

Parts and Tools

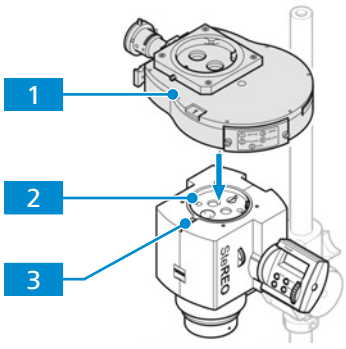
- Hex key, 3.0 mm
- Screwdriver, 3.0 mm, ball head

Prerequisite

✓ *The binocular tube is removed [▸ 31].*

Procedure

1. Hold the PentaFluar S vertical illuminator with the connector for the illumination equipment pointing to the left.
2. Insert the PentaFluar S vertical illuminator 1 with the dovetail ring into the tube mount 2 on the microscope body.



3. Tighten the screw 3.
4. *Install the anti-glare shield [▸ 32].*
5. If required, install an intermediate tube (intermediate phototube, drawing tube or Y-tube).
6. *Install the binocular tube [▸ 31].*

10.2.3 Installing the Optical Fiber

⚠ WARNING

Hazardous light emission

Accidentally or intentionally looking into emitted light of the light source can damage the eye.

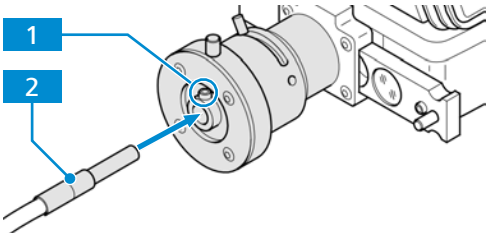
- Never look directly into the light-emitting aperture of the light source.
- Before installing or removing the light source always make sure it is switched off.

Parts and Tools Hex key, 1.5 mm

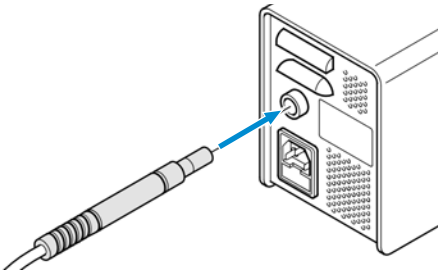
Prerequisite ✓ *The PentaFluar S vertical illuminator is installed [▸ 65].*

Procedure

1. Loosen the screw 1 on the mounting port of the PentaFluar S vertical illuminator.



2. Push the thin end of the optical fiber 2 into the mounting port as far as it will go .
3. Tighten the screw.
4. Push the larger end of the optical fiber into the fluorescence excitation illuminator as far as it will go.



5. Connect the illuminator to the power supply.

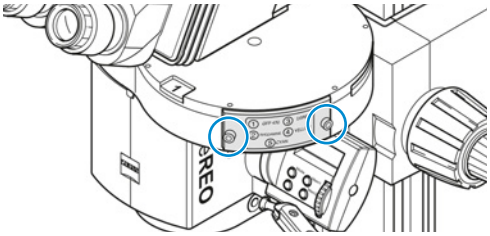
10.2.4 Installing Filter Blocks into the PentaFluar S Vertical Illuminator

Parts and Tools Hex key, 1.5 mm

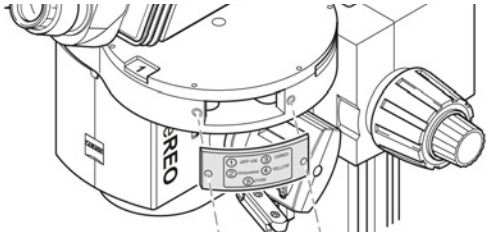
Prerequisite ✓ The light source is switched off.

Procedure

1. Remove two screws from the mounting aperture of the PentaFluar S vertical illuminator.

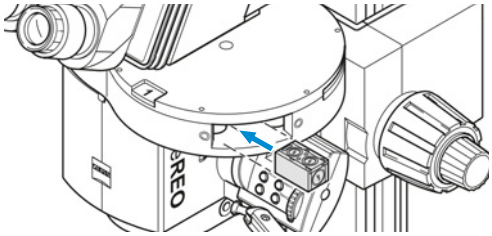


2. Remove the cover.

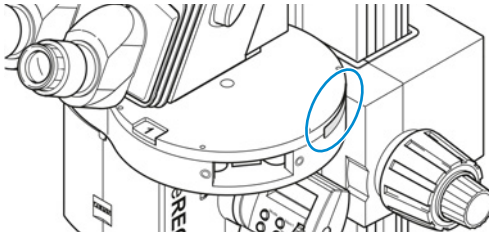


3. Hold the filter block with the barrier filters pointing up and the exciter filter pointing outward.

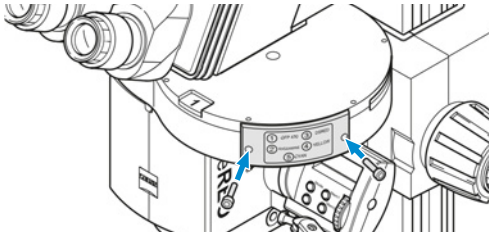
4. Push in the filter block through the installation aperture until the magnetic fixation device catches the filter block and positions it in the correct place.



5. Turn the filter wheel by one position.



6. Insert the next filter block.
7. Proceed in the same way for all other filter blocks.
8. Install the cover.
9. Tighten the two screws.



10. Affix the supplied self-adhesive labels for the filter combinations to the cover allocated to the corresponding position numbers.

Proceed in the reverse order for removal.

10.3 Transmitted Light Equipment S

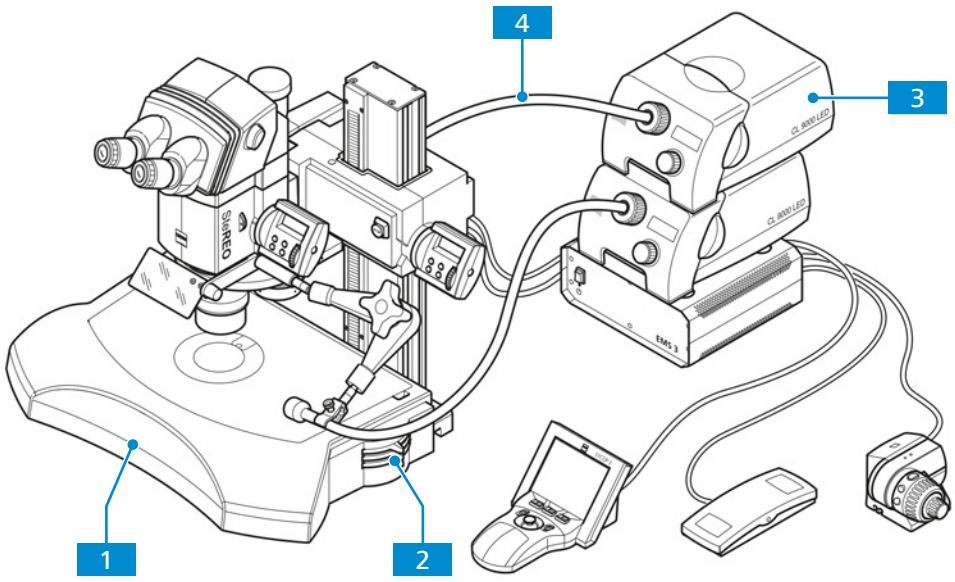


Fig. 13: Lighting control

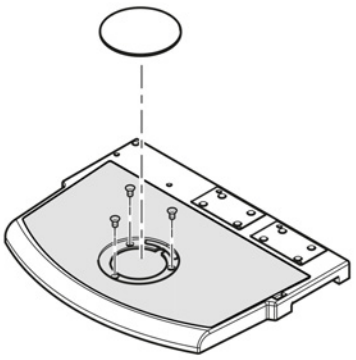
1	Transmitted light equipment S	2	Lighting controls
3	Cold light source for transmitted light equipment S	4	Supply light guide

10.3.1 Installing the Transmitted-Light Equipment S

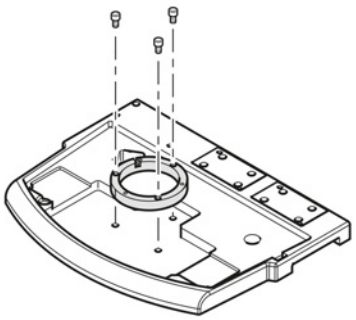
Parts and Tools Hex key, 3.0 mm

Procedure

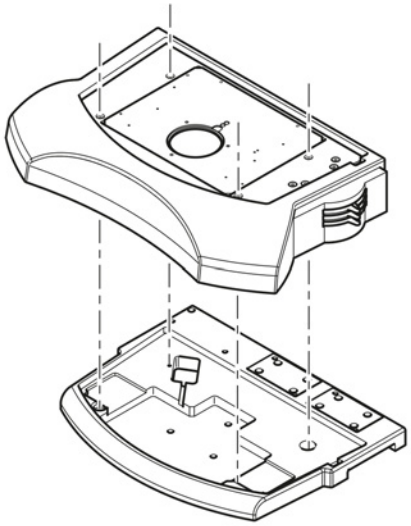
1. Loosen the three short Allen screws.



2. Remove the insert plate.
3. Loosen the three Allen screws of the adapter ring.

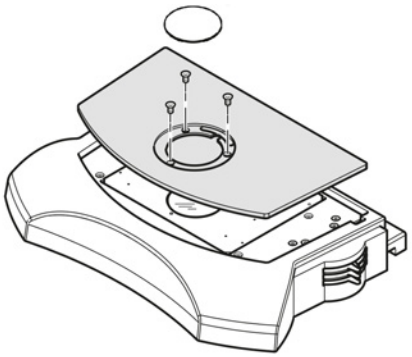


4. Remove the adapter ring.
5. Put the transmitted-light equipment S laterally correct onto the stand base. Ensure that the two large plastic taper pins on the bottom of the transmitted-light equipment S engage with the respective holes of the stand base.
6. Fix the transmitted-light equipment S with four Allen screws.

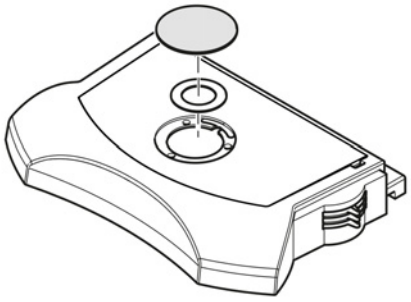


7. Put the insert plate onto the transmitted-light equipment S.

8. Insert the opal glass plate D = 84 mm to avoid that screws and other small parts get lost during the further installation work.



9. Fix the insert plate (without stage adapter) with three Allen screws to the transmitted-light equipment S.
10. Remove the opal glass plate.
11. Insert the insert 52/84 into the small opening of the insert plate.



12. If required, install a stage.
13. If no stage is installed, insert the 120 mm glass plate into the large opening of the insert plate.

10.3.2 Adjusting the Transmitted Light Equipment S

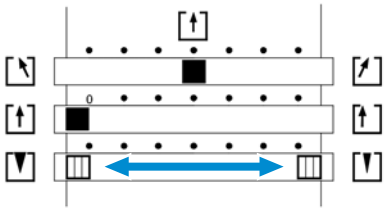
Prerequisite

✓ The transmitted light equipment S is connected.

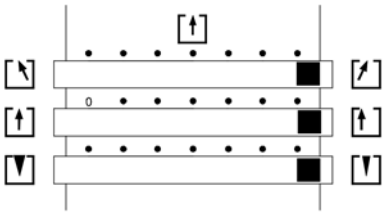
✓ The cold light source of the transmitted light equipment S is switched on.

Procedure

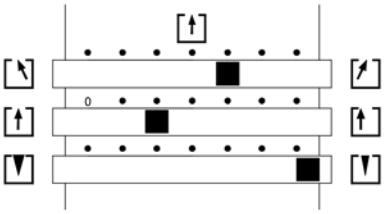
1. For low levels of magnification, insert the Ø 84 mm opal glass plate.
2. To avoid glare by transmitted light, swivel in the anti-glare shield.
3. Adjust the illumination intensity of the cold light source.
4. Set the desired transmitted light contrast using the lighting controls.
   a Settings for transmitted light brightfield:



   b Settings for transmitted light darkfield:



   c Settings for transmitted light oblique illumination:



Several intermediate positions can be used to optimize the contrast:

Symbol	Technical description	Applicative description
	Light bundle emerges vertically (reflector inclined 45°)	Bright field
	**Inclination** of the light bundle to the observer (risk of glare!)	Oblique illumination
	**Inclination** of light bundle away from the observer	Oblique illumination
	**Translation** of the light bundle to the observer	Oblique illumination
	White reflector surface of the mirror	Diffuse light quality
	Mirroring reflector surface of the mirror	Directed light quality (more contrast)

10.4 Coaxial Epi-Illumination S

Purpose The coaxial epi-illuminator S is intended for the illumination of flat, highly reflective objects (e.g. wafers, polished sections). Positioned horizontally, the surface appears bright, in high-contrast and free of hotspots.

The coaxial epi-illuminator S may also be used as a bright field illuminator of spatial objects with matt, diffusely reflecting surfaces. Diffuse surfaces also are illuminated, but with significantly lower brightness.

Info

The coaxial epi-illuminator S is not suitable for illuminating spatial, specularly reflective objects. Non-horizontal, mirror-like surfaces appear completely dark.

Info

Hints for application with specular (mirror-like) reflection

In case of specular reflection, i.e., with flat objects reflecting the light of the illumination source directly into the objective, vignetting of the field of view are possible when using low zoom magnifications.

Using SteREO Discovery.V12 or SteREO Discovery.V20 with eyepieces 10x/23, the Plan Apo S 1.0x objective works nearly without vignetting.

Using SteREO Discovery.V8 with eyepieces 10x/23, the Plan Apo S 1.0x, Plan S 1.0x, and Achromat S 1.5x objectives are nearly without vignetting. The documentation remains unimpaired in these cases.

With objectives > 1.0x higher magnifications and a better resolution can be achieved. Vignetting, however, should be considered when choosing the eyepiece. The coaxial epi-illuminator S is not recommended for objectives with magnifications < 1.0x, because the vignetting-free illuminated object fields are smaller than with 1.0x objectives.

10.4.1 Installing the Coaxial Epi-Illlumination S

Parts and Tools Hex key, 3.0 mm

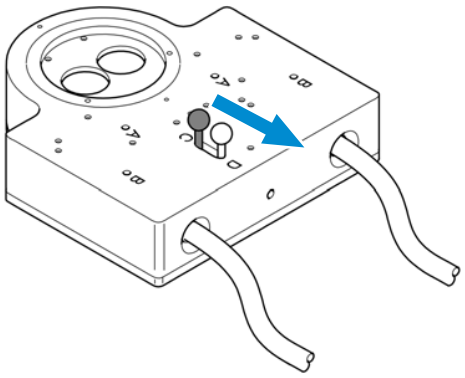
Prerequisite ✓ *The microscope is assembled [▸ 30].*

✓ The focusing drive is in the topmost position.

Procedure

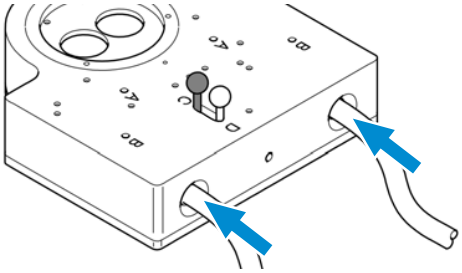
1. On the bottom of the epi-illuminator S, move the switching lever backwards to position **D** and retain it.

   NOTICE **To use the coaxial EPI illumination S with objective slider S/doc, unscrew the switching lever for light guide positioning and screw it in at the hole at the back of the epi-illuminator S.**

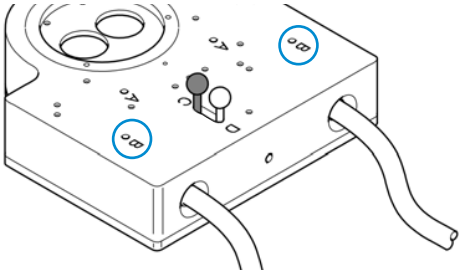


2. Insert both light guide arms carefully into the back holes of the epi-illuminator S.
   a Make sure that the end sleeve of the light guide is pushed past the clamping screws at the drill holes **B**.

b If necessary, loosen the clamping screws slightly to let the light guide pass through.

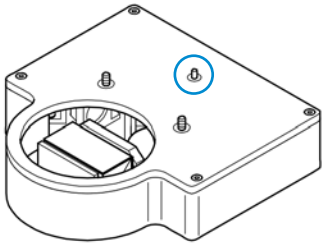


3. Thread the light guide arms into the light guide slot and push them to stop.
4. Tighten the clamping screws through the drill holes B.

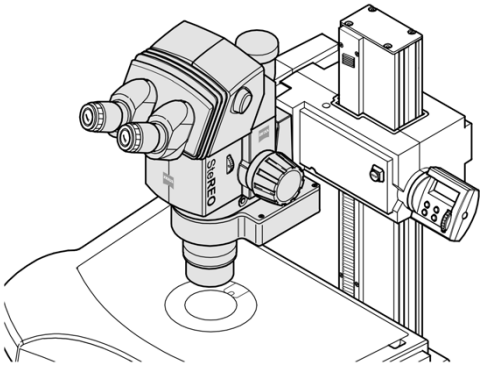


5. Unscrew the objective from the microscope body.

6. Turn the coaxial epi-illuminator S around.
   → The guide pin is facing upwards.



7. Insert the rear guide pin and the two clamping screws into the holes under the mount S and hold the coaxial epi-illuminator S in position.
8. Attach the coaxial epi-illuminator S by fastening the two screws through the holes **A** in the mount S.
9. *Screw the objective [▸ 31]* into the coaxial epi-illuminator S or install the *objective slider S/doc [▸ 74]*.



10.4.2 Adjusting the Coaxial Epi-illuminator S

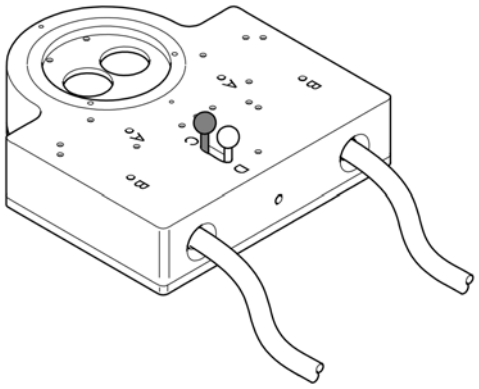
Prerequisite

✓ The microscope is operational.

✓ The coaxial epi-illuminator S is *installed [▸ 71]*.

Procedure

1. Set the lever to position **C** or **D** to optimize homogeneity and minimize vignetting (depending on objective and sample).



2. To use the coaxial epi-illuminator S in "Vertical View Mode" (objective slider S/doc is moved to the right-hand position), the lambda quarter cap must be attached to the objective. Turn it, until a high-contrast, homogeneous image quality is achieved.

10.5 Objective Slider S

Info

The objective slider S can only be used in conjunction with the mount S (with Ø 76 mm support) and, if desired, with the coaxial epi-illuminator S. It is not functional in combination with the objective nosepiece S/doc.

Position The objective slider is mounted on the underside of mount S, or of the coaxial epi-illuminator S, above the objective.

Function The objective slider S allows positioning the objective in three click-stop positions for stereoscopic and vertical observation..

Click-stop position	Function
Left	for vertical observation and documentation through the left optical Discovery channel, of a sample detail 12 mm to the left from the middle
Middle	for stereoscopic observation of the sample detail
Right	for vertical observation and documentation through the right optical Discovery channel, of a sample detail 12 mm to the right from the middle

To observe the same object detail in all three positions, the sample must be moved 12 mm to the left or right. This is facilitated by the use of gliding stages or mechanical stages - and can be automated using motorized stages.

Adding an *Y intermediate tube [▸ 78]* enables binocular vertical observation (in 2D) when the objective is set to the righthand slider position.

10.5.1 Installing the Objective Slider S

Parts and Tools

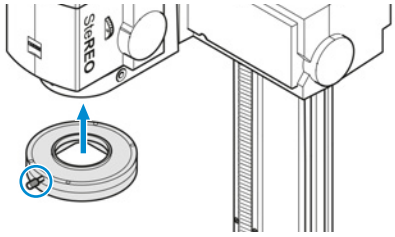
- Hex key, 1.5 mm

Prerequisite

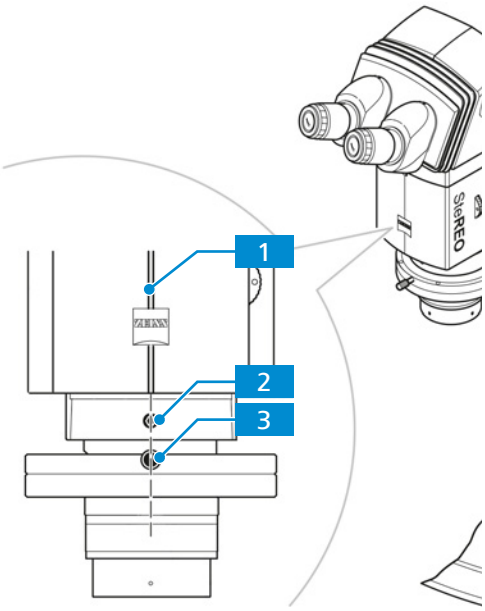
- ✓ The focusing drive is in the topmost position.
- ✓ The objective is removed.

Procedure

1. Remove the screw from the objective slider and put it aside.
2. Hold the objective slider with both hands and screw it into the microscope body as far as it will go.



3. Install the objective.
4. Reinstall the screw on the objective slider 3, but do not tighten it
5. Loosen the screws on the mount S 2.
6. Align the screws of the objective slider 3 and the mount S 2 with the joint of the microscope body 1.



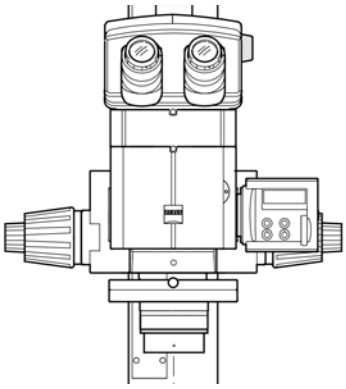
7. Hand-tighten the screws on the objective slider 3 and on the mount S 2.
8. *Adjust the lower limit switch of the motorized focusing drive [▸ 32].*

10.5.2 Operating the Objective Slider S

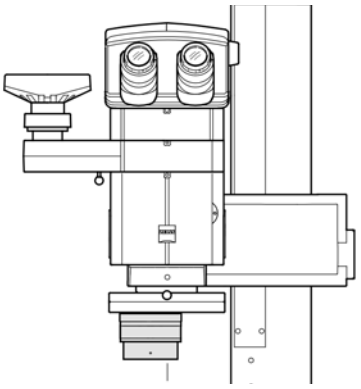
Prerequisite ✓ The objective slider S is *installed [▸ 74]*.

Procedure

1. For stereoscopic observation, slide the objective to the middle position.



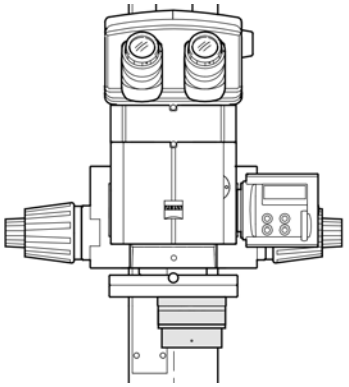
2. For vertical documentation using intermediate phototubes with camera port, slide the objective to the to the left position.



   a Switch the photo tube to camera observation.

   b Move the objective carefully to the left stop position of the objective slider.

3. For vertical documentation using binocular photo tubes or intermediate phototubes with camera port, slide the objective to the right position.



   a Switch the photo tube to camera observation.

   b Move the objective carefully to the right stop position of the objective slider.

4. For binocular eyepiece observation in the right vertical view position, install an*intermediate Y-tube [▸ 78]* and set it to 2D observation. Move the objective carefully to the right position of the objective slider.

10.6 Intermediate Tubes

If intermediate tubes are present, they must be installed between the microscope body and the binocular tube. They use the same dovetail interface.

Up to two intermediate tubes can be stacked.

10.6.1 Intermediate Phototube S Mot., Right 100/100

Purpose Using the intermediate phototube S mot., right 100/100, a camera can be connected on the right side of the microscope body.

Function The switching of the intermediate phototube S mot can be automated by using Sycop 3 or the ZEN software.

Position The intermediate phototube is mounted between the microscope body and the binocular tube. One additional intermediate tube can be mounted above or below the intermediate phototube.

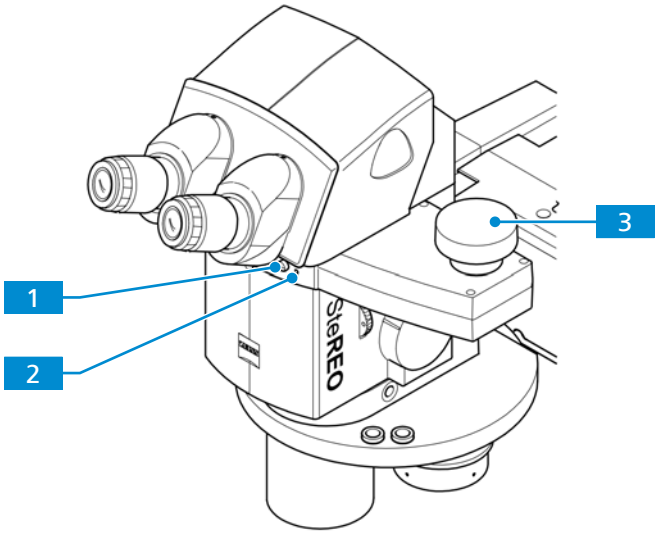


Fig. 14: Intermediate phototube S mot., right 100/100

1	Button	2	Blue LED
3	Camera port		

10.6.1.1 Connecting the Intermediate Phototube mot., right 100/100 Via CAN

Prerequisite ✓ The intermediate phototube is mounted between the microscope body and the binocular tube.

Procedure

1. Connect the CAN bus port at the back of the intermediate tube with one of the following CAN bus ports:
   a CAN bus port of the focus motor
   b CAN bus port of the EMS 3 Electronic Module
   c a free CAN bus port of another CAN bus accessory component
   d plug-in power unit RJ45-CAN (direct power supply)

10.6.1.2 Changing the Beam Path of the Intermediate Phototube S Mot., Right 100/100

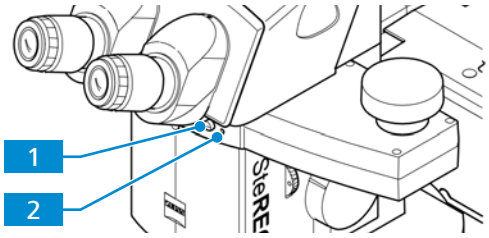
Prerequisite

✓ The intermediate phototube is installed and *connected [▸ 76]*.

✓ The microscope is operational and switched on.

Procedure

1. Briefly press the button 1.



→ The microscopic beam path is switched between "visual observation" and "camera observation".

→ If the camera port is active, the blue LED 2 is lighting.

10.6.2 Intermediate Phototube S, Right, 3 Pos.

Purpose

Using the intermediate tube S, right, 3 pos., a camera can be connected on the right side of the microscope body. The light is directed to the eyepieces, to the attached camera or to both simultaneously. The intermediate tube S, right, 3 pos. is required for documentation with the objective nosepiece S/doc in macroscope position.

Position

The intermediate phototube is mounted between the microscope body and the binocular tube. One additional intermediate tube can be mounted above or below the intermediate phototube.

The following features are available observing through the right Discovery beam path:

- camera port with interface 60N
- camera installed on the right side
- slide rod with three positions
  - slide rod pushed in: Stereoscopic observation through eyepieces and camera documentation are possible in parallel. Each port receives 50% brightness.
  - slide rod in middle position: The entire light of the right Discovery channel (100% intensity) is available for the camera. Visual observation is still possible through the left eyepiece - with 100 % intensity, but only in 2D.
  - slide rod pulled out: The entire light of the two Discovery channels (100% intensity) is available for stereoscopic observation through the eyepieces. No light is sent to the camera.

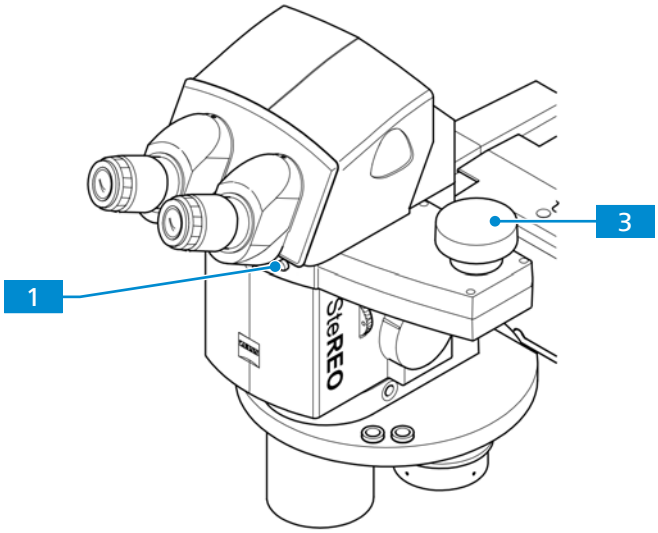


Fig. 15: Intermediate phototube S, right, 3 pos.

1	Slide rod	2	Camera port

10.6.3 Y Intermediate Tube S

Purpose The Y intermediate tube S is enables quick switching between stereoscopic observation and binocular vertical observation through the righthand Discovery channel (in 2D).

Position The Y intermediate tube S is mounted between the microscope body and the binocular tube. It can be mounted on intermediate phototubes. It must be used in conjunction with the objective slider S/doc or the objective nosepiece S/doc.

The two positions of the slide rod have the following functions:

- slide rod pushed in: Objective slider S/doc or nosepiece S/doc must be set to vertical view position. The binocular vertical observation through both eyepieces is enabled (in 2D).
- slide rod pulled out: Objective slider S/doc or nosepiece S/doc must be set to stereo position. The stereoscopic observation through both eyepieces in enabled.

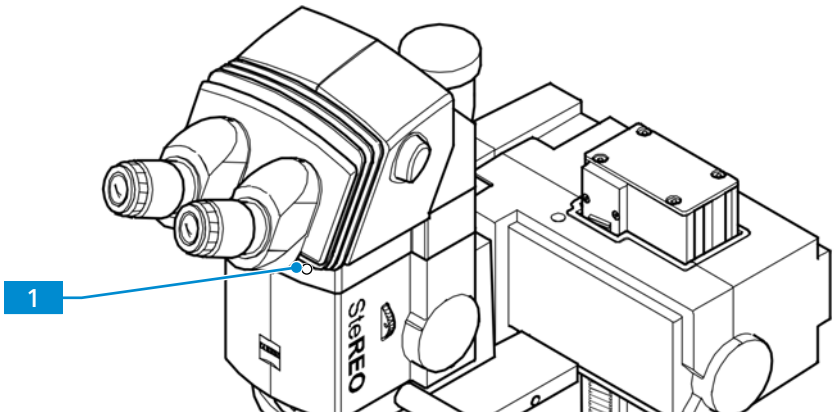


Fig. 16: Y intermediate tube S

1	Slide rod

10.6.4 Y Intermediate Tube S Mot

Purpose The Y-intermediate tube S mot is designed for automatic switching between "stereoscopic visual observation" and "binocular vertical observation (2D)" when the nosepiece is moved between the stereo position and the vertical viewing position. By switching the nosepiece, the microscope automatically turns into a macroscope with a binocular vertical view of the specimen.

Position The Y intermediate tube S mot is mounted between the microscope body and the binocular tube. It can be mounted on an intermediate phototube.

Function Manual switching by key press:

- **OFF**: Stereoscopic visual observation is enabled. The blue status LED is switched off.
- **ON** : Binocular visual observation (in 2D) through eyepieces enabled. 50% of the light of the right Discovery channel is directed to each eyepiece. The LED is lighting blue.

Automatic switching: The Y intermediate tube S mot is switched, whenever the coded objective nosepiece S/doc is manually moved between stereo position and vertical view position.

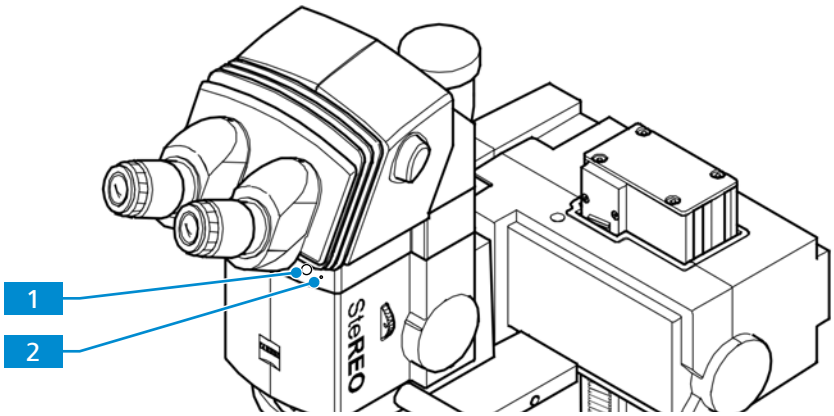


Fig. 17: Y intermediate tube S mot

1 Button **2** LED

10.6.4.1 Connecting the Y Intermediate Tube S Mot Via CAN

- In the case of a mainly manual microscope configuration without further motorized components, the Y intermediate tube S mot is connected directly to the nosepiece S/doc via a CAN cable and is supplied via its own separate power supply unit.
- In the case of a microscope with additional motorized components, all CAN components (including the Y intermediate tube S mot and the nosepiece) are connected to the motorized focusing drive or the EMS 3 Electronic Module via CAN cabling. Power is supplied via a separate power supply unit on the motorized focusing drive or via the EMS 3.

Prerequisite

✓ The Y intermediate tube S mot is mounted between the microscope body and the binocular tube.

✓ The objective nosepiece S/doc is installed.

Procedure

1. Using the supplied 1 m long cable, connect one CAN bus port at the back of the Y intermediate tube to one of the following CAN distributors:
   a CAN bus port of the focus motor.
   b CAN bus port of the EMS 3.
2. Using the supplied 0.5 m long cable, connect the second CAN bus port of the Y intermediate tube to the CAN bus port of the objective nosepiece S/doc.

10.6.4.2 Changing the Beam Path of the Y Intermediate Tube S Mot

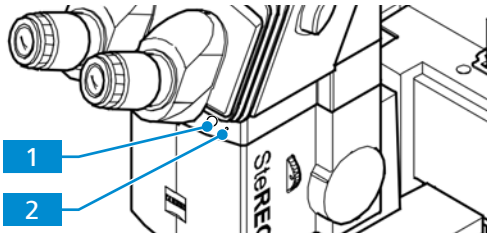
Prerequisite

✓ The Y intermediate tube is installed and *connected [▶ 79]*.

✓ The microscope is operational and switched on.

Procedure

1. Briefly press the button 1.



→ The Y intermediate tube is switched between stereoscopic observation and binocular 2D observation of the right Discovery channel.

→ If the Y intermediate tube is in position **ON**, the blue LED 2 is lighting.

10.6.5 Analyzer Intermediate Tube S Mot Mono

Purpose Using the analyzer intermediate tube S mot mono, a polarization filter can be swung into/out of the right stereo channel. The direction of transmission of the intermediate tube with analyzer is east-west. The polarizers of the associated reflected light/transmitted light illuminator must be adjusted to the analyzer intermediate tube.

Position The analyzer intermediate tube S mot mono is mounted between the microscope body and the binocular tube.

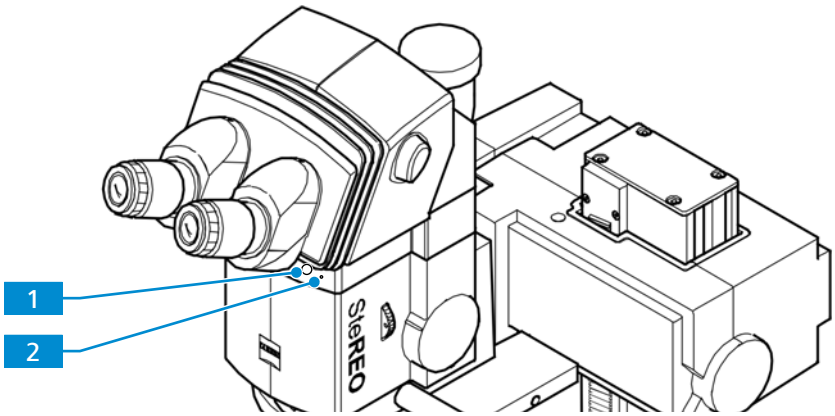


Fig. 18: Analyzer intermediate tube S mot mono

1 Button 2 LED

Function Automatic switching of the motorized analyzer corresponding to the workflow of the "technical cleanliness analysis" can be realized by software (ZEN).

10.6.5.1 Connecting the Analyzer Intermediate Tube S Mot Mono Via CAN

Prerequisite

✓ The analyzer iIntermediate tube S mot mono is mounted between the microscope body and the binocular tube.

Procedure

1. Connect one CAN bus port of the analyzer intermediate tube to one of the following CAN distributors:
   a CAN bus port of the focus motor
   b CAN bus port of the EMS 3
   c a free CAN bus port of another CAN bus accessory component
   d plug-in power unit RJ45-CAN (direct power supply)

10.6.5.2 Operating the Pol Analyzer of the Intermediate Tube S Mot Mono

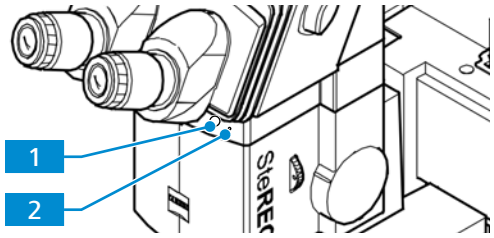
Prerequisite

✓ The analyzer intermediate tube is installed and *connected [▶ 80]*.

✓ The microscope is operational and switched on.

Procedure

1. Briefly press the button 1.



→ The analyzer intermediate tube is switched between "analyzer filter in path" and "analyzer filter out of path".

→ If the filter is in path, the blue LED 2 is lighting.

10.7 X-Cite XYLIS® Light Source

NOTICE

In addition to the white light LED, the X-Cite XYLIS II® illumination unit includes an internal laser source (class 1 laser) as part of the light generation inside the device. No laser radiation is emitted into the microscope via the light guide.

Purpose The X-Cite XYLIS II® liquid light guide coupled light source delivers a broad spectrum of excitation light for many fluorescence applications.

Position The X-Cite XYLIS II® light source is connected to the microscope by a light guide and an illumination adapter.

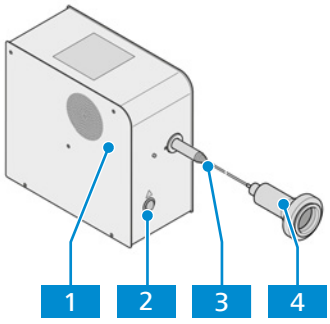


Fig. 19: X-Cite XYLIS II® light source

1	X-Cite XYLIS II® light source	2	**Power** switch
3	Light guide	4	Illumination adapter

10.7.1 Labels on the X-Cite XYLIS II Light Source

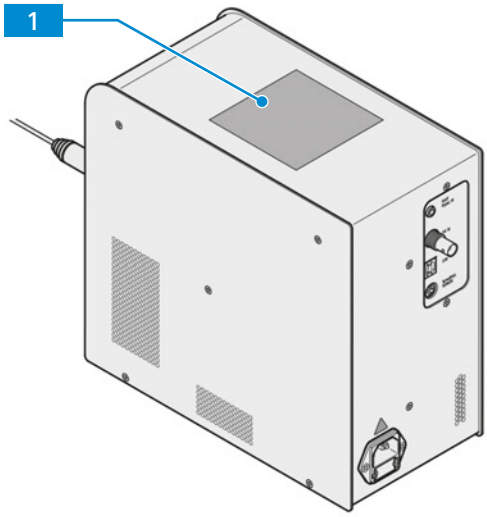


Fig. 20: Warning labels and information on the X-Cite XYLIS II light source

Pos.	Symbol	Description
1		UV Radiation and optical radiation warning label Risk group 3 according to IEC 62471 UV emitted from this product. Avoid eye and skin exposure to unshielded product. Possibly hazardous optical radiation emitted from this product. Do not look at operating lamp. Eye injury may result.

Revision History

Revision	Date of Issue	Introduced Modifications
1	05/2024	▪ New material number as successor of 435001-7944-001, revision 5. ▪ Editorial rework ▪ Adaptation to Directive 2014/35/EU (LVD)

Glossary

BF (Brightfield)

Illumination and imaging system where direct light passes through the objective aperture and provides a bright background against which the image is viewed.

CAN

Controller Area Network. An ISO specification that defines a generic physical layer and data link medium access procedure based on non-destructive bit-wise arbitration.

DF (Darkfield)

Illumination and imaging system that prevents direct light from entering the objective aperture.

FWD (Free Working Distance)

A distance in air, or in the specified immersion liquid, between the front of the objective and the surface of the cover glass, or of the object if uncovered, under normal operating conditions.

HIP

Human Interface Panel

IEC

The International Electrotechnical Commission (IEC) is an international standards organization that prepares and publishes international standards for all electrical, electronic and related technologies – collectively known as "electrotechnology".

IP

Ingress Protection, a standardized classification of protection against intrusion, dust, accidental contact and water

LED (Light emitting diode)

Solid state device embodying a p-n junction, emitting optical radiation when excited by an electric current.

MaRC

Manual Rotary Control

RL (Reflected Light)

Designation for microscopy techniques to image light that was reflected by the object

TL (Transmitted Light)

Light used for illuminating a object, where the light is transmitted through the object.

UV (Ultraviolet)

Of, relating to, or consisting of radiation lying in the ultraviolet range.

ZEISS service representative

Specially trained service expert, either ZEISS staff or authorized service partner of ZEISS.

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